
JOURNAL
OF THE
ARNOLD ARBORETUM

VOL. XXVIII

APRIL 1947

NUMBER 2

A MONOGRAPH OF THE GENUS STREBLOSA
KORTHALS (RUBIACEAE)

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With two text-figures

INTRODUCTION

KORTHALS DESCRIBED in his "Overzicht der Rubiaceën van de Nederlandsch-Oostindische Kolonien" (in Ned. Kruidk. Arch. 2 (2): 245. 1851) i.a. a new genus *Streblosa*, to which he referred Blume's *Psychotria tortilis* and two species based on specimens which he had collected himself in Sumatra and Borneo. Although he gave no explanation of the name, we may safely assume that it refers to the peculiar arrangement of the flowers along the branchlets of the inflorescence which they encircle in the same way in which the shoot of a winding plant twines round its support. Blume's epithet *tortilis* too was apparently inspired by the arrangement of the flowers.

Korthals' generic description contains several inaccuracies; the calyx is not 5-dentate but 5-fid or, more rarely, 5-partite, the corolla-tube is not infundibuliform but cylindrical or, sometimes, in the upper half narrowly campanulate, and it is not glabrous inside but provided with a ring of hairs or with five hair-bundles, the aestivation of the lobes is not subvalvate but quite simply valvate, the ovules are neither peltate nor attached to the centre of the septum but ascending from the inner angle of the ovary-cells, the pyrenes are not plane on the inside but provided with two quite conspicuous contiguous excavations, and the embryo is not amphitropous but straight; the plants moreover are not fruticose but herbaceous, and their inflorescences are not axillary but at first terminal and subsequently pseudo-axillary.

The generic description is followed by a note in which he gives an exposition of the reasons which induced him to separate this genus from *Psychotria*. It is reproduced here in English translation: "On account of

their habit it seemed to me that the generic identity of the species here referred to *Streblosa* with species belonging either to *Psychotria* or to *Grumilea*, already looked dubious, for they differ from them in their membranous, reticulately veined leaves and in the peculiar corymbose inflorescence. The analysis of the flower revealed, in addition to a number of identical features, in the structure of the ovary a diagnostic character of sufficient importance: whereas in *Psychotria* the ovules arise from the bottom of the cells, they are in *Streblosa* attached to the centre of the septum and peltate." The argument derived from the position of the ovules, by which Korthals apparently set great store, and which he thought would justify the creation of the new genus before the tribunal of his fellow botanists, unfortunately was based on inaccurate observation: in reality the ovules of *Streblosa* arise just like those of the other Psychotriaceae from the inner angle of the ovary-cells.

Miquel already had some doubts with regard to Korthals' description of the position of the ovules. In his "Flora Indiae Batavae" (2: 294. 1857) he reduced the genus to a subdivision of *Psychotria* for which he retained the name *Streblosa* and which he characterized with the aid of the data provided by Korthals. An interrogation mark, however, is put behind the words with which the attachment of the ovules to the middle of the septum is described. Afterwards Miquel's valuation of the distinguishing characters underwent a change, for in his "Eclogae Rubiacearum Archipelagi Indici" (in Ann. Mus. Bot. Lugd.-Bat. 4: 211. 1869) the genus is reëstablished. As no generic description is given, and as no comment is made on this change of attitude, it is impossible to say how the latter was brought about. It is noteworthy that Miquel corrected in this work Korthals' assertion with regard to the habit of *Str. tortilis* (Bl.) Khs: he himself describes it as an herbaceous plant. Of the two new species described by Korthals only one, the Sumatran *Str. polyantha*, was found by Miquel in the Leiden herbarium (l.c. 262); it seems that the specimen on which the other species, the Bornean *Str. undulata*, was based, had disappeared already, and the type of *Str. tortilis* var. β , collected by Korthals on G. Singalang in West Sumatra, which is said to differ from the form described by Blume in its sessile inflorescences and elliptic leaves, was not met with either; in contradistinction with *Str. undulata* (v. infra) it has never again been mentioned in literature. It may have been conspecific with one of the Sumatran species dealt with below, but nothing definite can be said with regard to its identity.

Hooker f. reduced *Streblosa* in Benth. et Hook. f., Gen. Pl. 2: 124, 125. 1873, to *Psychotria*: as this author attached great importance to the position of the ovules, it is unlikely that he would have made this reduction if he had not convinced himself of the inaccuracy of Korthals' description. The type-species was referred by Hooker to the section Mapouria (a ebracteatae), where it occupies on account of the persistent bifid stipules, the cincinnate arrangement of the flowers, the small green fruits and the two contiguous excavations on the ventral side of the pyrenes, a most

anomalous position. Korthals' other species are not mentioned, but a plant collected in Penang and in the Wallich herbarium, inserted under the provisional name *Psychotria microcarpa* Wall., is declared conspecific with *Ps. tortilis* Bl., an error which was repeated by King and Gamble in their "Materials for a Flora of the Malay Peninsula" (in Jour. As. Soc. Beng. 72 (2): 11. 1906) and by Ridley in his short survey of the genus *Streblosa* in Jour. As. Soc. Straits 57: 62. 1911. It was corrected by the latter in his "Flora of the Malay Peninsula" (2: 148. 1923).

Baillon referred *Streblosa* in *Adansonia* 12: 325. 1879 and in his "Histoire des Plantes" (7: 285. 1880) to *Uragoga* L., which in his delimitation is an even more unwieldy genus than *Psychotria* L. in that of Hooker, and it is therefore not necessary to discuss this reduction. It is noteworthy, however, that he corrected Korthals' assertion with regard to the aestivation of the corolla-lobes. Writing of *Str. tortilis* he stated in *Adansonia*: "Sur les échantillons que nous avons pu examiner, toutes les corolles étaient simplement valvaires."

Schumann made no mention of the genus *Streblosa* in his monograph of the family in Nat. Pflanzenfam. 4: 4. 1891; and in the "Nachträge" to this work too I have vainly looked for any reference to it. In Dalla Torre & Harms, *Genera Siphonogamarum*, 503, 1905, however, it is included among the synonyms of *Psychotria*.

Stapf was, after Miquel, the first to recognize the generic distinctness of Korthals' genus. In his paper on the flora of Mt. Kinabalu (in Trans. Linn. Soc., Bot., II. 4: 182. 1894) he described a new species, *Str. urticina*, and expressed himself with regard to its generic position in the following terms: "I think *Streblosa* should be kept up as a distinct genus on account of its peculiar habit, which is produced chiefly by the herbaceous growth, by the very thin leaves, the axillary inflorescences (which in the present species resemble very much those of a common nettle), and by the minute flowers and fruits. Miquel says of *Streblosa* 'frutices'; but the specimens of *S. tortilis* (Bl.) Korth., the only species seen by him, are decidedly herbs. The genus *Streblosa* is limited to Malaya." The statement that the inflorescences are axillary, is incorrect: in reality they are terminal but soon pushed aside by an axillary branch developing in the axil of one of the two highest leaves. The reference to Miquel is incomplete: in the "Flora Indiae Batavae" the latter merely repeated Korthals' statement, but in his paper in the "Annales" he described *Str. tortilis* correctly as "herba basi radicans."

The next author who recognized *Streblosa* as a distinct genus, was Valeton. In Bot. Jahrb. 44: 568. 1910, he described a new species, *Str. glabra*, based on a specimen collected by Winkler (Breslau) in South-east Borneo; it appears very close to *Str. urticina* Stapf. At the same time he gave a more detailed description of *Str. undulata* Khs., based on some other specimens collected by Winkler in the same region as *Str. glabra* and as Korthals' type. Whether these specimens really are conspecific with the latter, is difficult to say, because of Korthals' incomplete description, but

it should be noted that the leaves are elliptic according to Korthals, whereas Valeton states that they are 90–120–150 mm. \times 35–50 mm., which means that they are lanceolate in his specimens. However, as there is little chance that Korthals' type will ever be recovered, and as there is otherwise nothing in his description which positively excludes the possibility that his type was conspecific with the specimens described by Valeton, the latter's interpretation may perhaps be accepted.

At about the same time Ridley (in Jour. As. Soc. Straits 57: 62. 1911) devoted a few pages to *Streblosa*. He agreed with Stapf that the genus should be restored, but no new arguments were brought forward to support this view. He recognized seven species, i.e. apart from the three for which the genus was created and the one described by Stapf, three new ones. Of these three the first, *Str. hirta*, is probably identical with *Str. polyantha* Khs., of which Ridley had seen no material. The only difference which I can find in comparing Korthals' specimens with Ridley's description, lies in the slightly narrower leaves (10–15 cm. \times 3.7–5.0 cm. instead of 9–12 cm. \times 4.5–5.7 cm.). In the description of *Str. pubescens* Ridl. there are a few points which make the position of this species altogether dubious: the stipules are said to be lanceolate-acuminate, whereas in this genus they are always two-lobed; the stamens should be inserted near the base of the tube instead of in the ring of hairs in the middle or somewhat above the middle, the stamens as well as the style should be included, whereas the flowers of *Streblosa* are always heterostylous with either the stamens or the style exserted, and the disc is said to be composed of 5 reniform bodies, whereas I found it in *Streblosa* always semi-globose or annular with a single, more or less distinct, transverse impression on the top. For the time being, therefore, I consider *Str. pubescens* a "species incertae sedis." The third species, *Str. bracteata*, on the other hand, is a true representative of the genus, probably nearly related to the plant afterwards described by Merrill under the name *Str. myriocarpa*. Like the latter it is found in West Borneo. Ridley remarked with regard to *Str. urticina* Stapf that he saw in the herbarium of the Botanic Gardens, Singapore, a specimen collected by Haviland and bearing the number of the type, which was "decidedly woody," whereas Stapf described it as "herbaceous and scandent." Ridley was right in so far that the plant is certainly no climber, and that it is woody at the base: as secondary thickening, however, is by no means uncommon in the basal parts of the stems of dicotyledonous herbs, this is no valuable argument against its herbaceous character.

In the following year Elmer (Leaf. Philipp. Bot. 4: 1356. 1912) published some remarks on a plant which he had collected in the island Palawan, and which he referred to *Str. glabra* Val. It differs, however, conspicuously from the latter by the nature of the stipules, whose lobes are separated from each other by a rather wide gap instead of being contiguous. His remarks contain several mistakes: the valvate corolla-lobes are described as imbricate and slightly twisted from left to right;

the stamens are said to be inserted in the basal part of the corolla-tube, and the anthers should be more or less united, the stigma "submitraform," the ovary "superior or nearly so, surrounded by 5 lobular disk appendages," and the ovules should be pendulous. That the genus is said to be monotypic and previously known from Borneo only, may be regarded as a slip of the pen.

In the same year Valeton (in *Icones Bogorienses* 4: 139, t. 343. 1912) published a detailed description of *Str. tortilis* (Bl.) Khs., accompanied by a plate which unfortunately is not entirely satisfactory. His ideas on the generic characters are summarized in the following sentence: "Le port de la plante, les inflorescences axillaires, l'insertion scorpioïde des fleurs sur les rameaux (voir la figure 2 dans la table citée de Stapf) et la structure du fruit sont autant de caractères de valeur générique et qui séparent la *Streblosa* du genre *Psychotria*." Valeton therefore was the first to recognize the taxonomic importance of the monochasial structure shown by the ultimate ramifications of the inflorescence, and although he calls the latter here for sake of convenience axillary, the remarks in his paper in *Bot. Jahrb.* 44: 568. 1910, show that he knew very well that they are in reality at first terminal and afterwards pseudo-axillary.

A few years later Merrill (in *Philipp. Jour. Sci. Bot.* 10: 141. 1915) described under the name *Str. axilliflora*, a new species from the Philippines. In a short note attached to the description he remarks: "I am in agreement with Valeton and with Ridley in considering *Streblosa* Korthals to be a valid genus. In aspect the plants are entirely different from *Psychotria* and *Grumilea*, and the differential characters appear to be constant. From all our representatives of *Psychotria* and *Grumilea* the present species is distinguished by its minute fruits and axillary inflorescences; surely, if *Grumilea* is to be separated from *Psychotria*, there are as great or greater reasons for distinguishing *Streblosa* as a valid genus." Merrill afterwards (Enum. Philipp. Fl. Pl. 3: 564. 1923) identified the Philippine species with *Str. glabra* Val., but this was an error: it differs from the Bornean species in the same way as the plant collected by Elmer in Palawan, the stipular lobes namely are not contiguous but separated from each other by a rather wide gap, and the internodes are ecostate.

Since then one new species was described from the Malay Peninsula by Ridley and eight from Sumatra and Borneo by Merrill. With regard to our knowledge of the generic characters however, no further progress was made. In this paper a detailed analysis of the generic characters is given. Twenty-five species are described, and an attempt is made to arrange them in a more or less natural sequence. Eleven of the twenty-five species are new, whereas three of the old ones, namely *Str. hirta* Ridl., *Str. platyphylla* Merr. and *Str. puberula* Merr. are reduced to synonymy, and one, *Str. pubescens* Ridl., set apart as a "species incertae sedis." Of *Str. urticina* Stapf and of *Str. palawanensis* Brem. two varieties are recognized, and of *Str. axilliflora* Merr. three.

GENERIC DESCRIPTION

Streblosa Khs. in Ned. Kruidk. Arch. 2 (2): 245. 1851; Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 211, 262. 1869; Stapf in Trans. Linn. Soc. Bot. II, 4: 182. 1894; Val. in Engl., Bot. Jahrb. 44: 567. 1910; Ridl. in Jour. As. Soc. Straits 57: 62. 1911; Val. in Ic. Bog. 4: 141. 1912; Elmer, Leaf. Philipp. Bot. 4: 1356. 1912; Merr. in Philipp. Jour. Sci. Bot. 10: 141. 1915, Enum. Philipp. Fl. Pl. 3: 564. 1923; Ridl., Fl. Mal. Pen. 2: 148. 1923; Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929; Lemée, Dict. Pl. Phan. 6: 335. 1935; Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 295. 1937, in Papers Mich. Acad. Sci. 22: 194. 1938.

Psychotria spec. Bl., Bijdr. Fl. Ned. Ind. 958. 1826; DC., Prodr. 4: 520. 1830; Miq., Fl. Ind. Bat. 2: 294. 1857, Suppl. 223, 1860; Hook. f. in Benth. et Hook. f., Gen. Pl. 2: 124, 125. 1873; Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1899; Dalla Torre & Harms, Gen. Siph. 503. 1905; King & Gamble in Jour. As. Soc. Beng. 72 (2): 11. 1906.

Uragoga spec. Baill. in Adansonia 12: 325. 1879; Hist. Pl. 7: 285. 1880.

Genus *Psychotriearum* caule sympodiali plerumque simplici, inflorescentiis primum terminalibus, deinde pseudo-axillaribus et ergo semper solitariis ad nodos, ramulis ultimis inflorescentiae quoque nodo floribus duobus instructis, florum paribus cincinnaliter dispositis, fructibus parvis et viridibus, globosis vel didymis, in mericarpia duo discindentibus, mericarpiis drupaceis, pyrenis dorso 3-costatis, facie ventrali excavatis et excavatione a carina mediana plus minusve distincta in partes duas divisa a generibus aliis ad tribum hanc pertinentibus distinguendum.

Herbae plerumque simplices, raro semel vel bis pseudo-dichotome furcatae, erectae vel saepius ascendentes, casu quo parte decumbente haud raro radicante et interdum ex axillis innovationes emittente. Caulis sympodialis. Folia opposita, quoque pari aequalia, petiolata; petiolus foliorum inferiorum plerumque satis longa et foliorum aliorum gradatim longitudine decrescens; lamina magna, plerumque tenuis, discolor, supra semper idioblastis in appendicem lenticularem vel conicam productis vix conspicue et interdum cellulis resiniferis valde conspicue punctata, subtus haud raro protuberantiis stomatiferis albido-lepidota, venulis paucis, laxe reticulatis. Stipulae interpetiolares in lobos duos exeuntes. Inflorescentiae plerumque plures quarum una terminalis et aliae solitariae ad nodos, i.e. primum terminales sed mox a ramulo axillari qui folia bina et inflorescentiam novam prodet in positionem pseudo-axillarem coactae, breviter vel rarius longe pedunculatae, ramulis plerumque 3 vel 5, subumbellatis, infimis interdum iterum in ramulos 3 divisis, casu quo ramuli 9 paniculatim dispositi, ramulis ceterum haud raro semel dichasialibus, ramificationibus monochasialibus, raro inflorescentia tota semel vel bis dichasialis, ramificationibus monochasialibus, vel tota monochasialis. Monochasia quoque nodo floribus duobus instructa, florum paribus cincinnaliter dispositis. Bractae forma et magnitudine diversae sed semper evolutae, interdum ad anthesin deciduae. Flores pedicellati vel subsessiles, semper 5-meri et heterostyli. Ovarium biloculare, loculis ovulo singulo ex angulo interiore ascendente instructis. Calyx plerumque 5-fidus, lobis triangularibus, ovato-triangularibus vel rotundatis, rarius 5-partitus, casu quo lobis interdum imbricatis. Corolla alba, maxime 8 mm. longa sed plerumque multo brevior, breviter hypocrateriformis, tubo interdum dimidio superiore paulum inflato, lobis valvatis, tubo intus ad medium vel supra medium annulo vel fasciculis 5 pilorum instructo. Stamina in annulo vel

inter fasciculos pilorum inserta, in flore longistylis subinclusa, in flore brevistylis exserta; filamenta glabra; antherae oblongae, dorsifixae. Granula pollinis globosa, minute reticulata, 3-pora. Discus semi-globosus vel annularis, apice interdum sulco instructus, glaber. Stylus glaber, in flore brevistylis inclusus, in flore longistylis exsertus; stigmata filiformia vel linearia, patentia, in flore longistylis apice recurvata. Fructus parvus, minus quam 3 mm. diam., viridis, globosus vel didymus, calyce persistente et disco plus minusve exsiccato coronatus, in mericarpia duo discindens; mericarpia drupacea; pyrenae dorso 3-costatae, facie ventrali excavatae, excavatione a carina mediana plus minusve distincta in partes duas divisa, endocarpio tenui. Semen endocarpio conforme, testa rubra vel rubromaculata, albumine uniformi corneo, embryo recto parvo, radícula inferiore.

Species adhuc notae 25, distributae in Peninsula Malayana, Sumatra, Java, Borneo, Insulis Philippinis, ubi in umbris nemorum crescunt.

SPECIES TYPICA: *Str. tortilis* (Bl.) Khs.

The stems are either erect or, more often, ascending, and there is doubtless a certain amount of vegetative propagation, young plants developing sometimes from the axils of the fallen leaves in the decumbent and rooting basal part. Even in those species that are provided with erect stems, for instance in *Str. Johannis-Winkleri* Merr., in which this kind of growth is perhaps most pronounced, I have sometimes found remains of old shoots at the base of the young ones. I suppose that in these plants the whole stem sinks down after the last fruits have ripened, and that here too new stems develop from axillary buds. That these innovations are but rarely met with in herbarium specimens, probably means that they are not regularly formed. In some of the species with ascending stems, especially in those in which the leaves do not show much difference in shape and size, e.g. in *Str. tortilis* (Bl.) Khs. and in *Str. bullata* Merr., development might even be continuous, the oldest part of the stem gradually decaying and the bent at the same time shifting in the direction of the younger parts: in such species innovations are perhaps formed only when the normal development in some way or other is checked.

Ramification is extremely rare: so far it has been observed in three species only, in *Str. lampongensis* Brem., *Str. chlamydantha* Brem. and *Str. longiscapa* Brem. It is always brought about in the same way, namely by the development of two axillary shoots instead of one at the base of an inflorescence. This is rather interesting from a morphological point of view, for it definitely proves the terminal nature of the inflorescence: without the evidence of the forked plants the latter would always remain somewhat dubious, for the terminal position of the young inflorescence might be spurious, and the presence of but one inflorescence at each node is in itself no sufficient proof.

In habit the *Streblosa* species therefore are not unlike those belonging to the genus *Notopleura* Brem. (*Psychotria* L. sect. *Notopleura* Hook f. in Benth. & Hook. f., Gen. Pl. 2: 124. 1873, cf. Brem. in Rec. d. trav. bot. Néerl. 31: 289. 1934), for the species of that genus too are herbaceous and

provided with usually simple, sympodial stems, the terminal inflorescence being pushed aside by an axillary shoot developing from the axil of one of the leaves at its base. In other respects, however, there are important differences. In *Notopleura* the leaves are succulent, the stipules undivided, the inflorescences paniculate or corymbose, the flowers ebracteate, the corolla-lobes imbricate, and the pyrenes dorsiventrally compressed and on the inner side flat or provided with a prominent keel; the genus, moreover, is confined to Tropical America. The affinity between *Streblosa* and *Notopleura*, therefore, must be regarded as rather remote.

Although the stems probably do not last for more than a few months, there is often a considerable amount of secondary thickening in their basal parts. As a rule the increase is almost entirely due to the formation of secondary xylem, but in the species described below under the numbers 1-11, there is also a considerable development of secondary bast. The formation of cork is, as a rule, but weak, and in most species the stem, therefore, remains green.

As in most of the plants belonging to the undergrowth of the forest, the leaves are, as a rule, large, flat, thin and discolorous. In the majority of the species belonging to the subgenus *Eu-streblosa* (*Str. tortilis*, *Str. myriocarpa*, *Str. maxima*, *Str. Johannis-Winkleri*, *Str. bullata*, *Str. bracteolata*, *Str. anambasica*, *Str. polyantha*, and to some extent in *Str. deliensis* and *Str. scabridula*) the underside of the leaves is covered with greyish scales, which under the microscope prove to be dome-shaped excrescences crowned by a stoma, an arrangement which apparently is not uncommon in shade plants. Taxonomically of more importance is the structure of the epidermis on the upper side. As in *Psychotria* the latter consists of straight-walled cells, but in the midst of these some much smaller ones are found which are produced above the common surface into lenticular or conical excrescences (fig. 1). The latter are often difficult to detect with the naked eye, but appear to be present in all species. In the other genera of the Psychotrieae I have looked, so far, in vain for them. Far more conspicuous are the reddish or black dots with which the upper side of the leaves of *Str. tortilis*, *Str. microcarpa*, *Str. polyantha*, and probably those of *Str. multiglandulosa*, which I could not investigate myself, are marked. These dots are caused by the presence of a dark-coloured resin in some of the epidermis cells. As a rule they are in these species a very conspicuous feature, but as a differential character they are of little value, for their development varies considerably, even in leaves of the same specimen; in some instances the cells contain little or no resin, and as the cells themselves are indistinguishable from the rest of the epidermis cells in shape and size, microscopical investigation too is in such cases of no avail. Of *Str. tortilis* and *Str. microcarpa* I have seen specimens in which the dots appeared to be completely absent.

Resin may also be present in some of the cells of the mesophyll and in the mesocarp of the fruit, and even in other parts of the plant, for instance in the cortex and in the secondary bast of the shoots; in the latter these

cells are arranged in short longitudinal rows. Their number varies considerably, and they are not always easy to detect, but it is almost certain that they are nowhere completely absent. One of the most suitable places to look for them, is the connective. In the species 1-6 they are a conspicuous feature of the secondary bast. When they are present in the mesophyll, the leaves are, as a rule, more or less distinctly marbled. It is noteworthy that such marbled leaves occur also in some related plants, e.g. in the Madagascar species of *Psychotria*.

Raphide-cells are in some species a conspicuous feature, whereas in others they are difficult to detect. This depends apparently on the consistency of the leaves, for microscopical investigation reveals that they are nowhere absent. As a matter of fact, they are a general feature of the whole tribe, and are also found in some of the latter's allies, for instance in the Hedyotideae, whereas they are constantly absent in the Ixoreae and their allies, which, as I have pointed out in my "Monograph of the genus

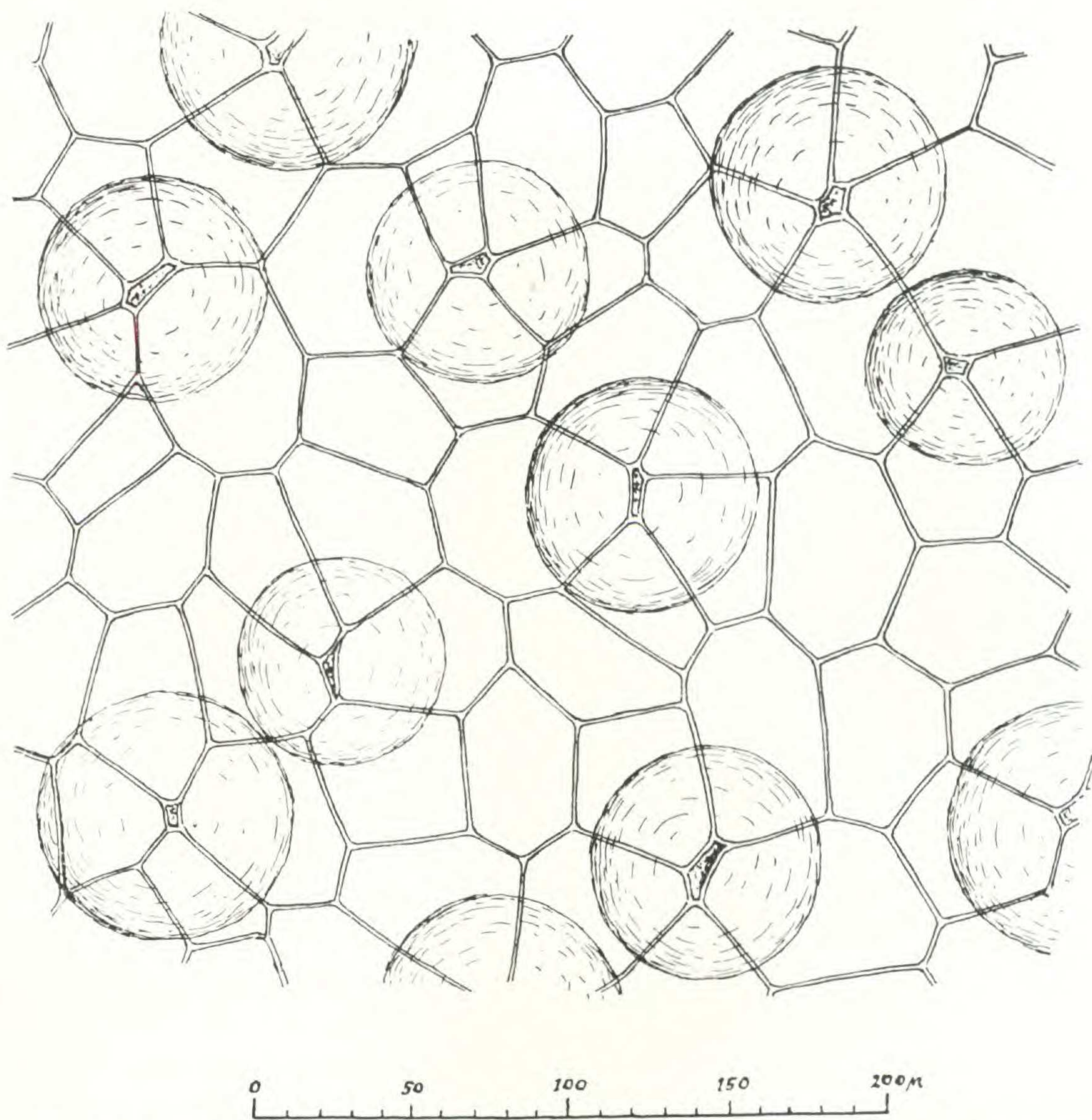


FIG. 1. Epidermis of the upper side of the leaf of *Streblosa myriocarpa* Merr.

Pavetta" (in Fedde's Repert. 37: 11, 12. 1934), form another circle of affinity.

The nervation of the leaves is very uniform; the meshes formed by the lateral nerves and the venules are large and more or less irregular in outline. Acaridomatia are always absent.

The stipules are always interpetiolar and produced into two lobes, but they vary considerably in size and shape. In the species belonging to the subgenus *Eu-streblosa* they are much larger than in the subgenus *Para-streblosa*, and in the first-named subgenus the basal part is stronger developed than the lobes, whereas in the species belonging to the latter the lobes are better developed than the basal part; in *Eu-streblosa* they are moreover more or less persistently ciliate or ciliolate, whereas in *Para-streblosa* they are eciliate. In part of the species belonging to the latter the basal part shows a prominent midrib which runs down to the preceding node. In these species, which form the series *Costatae*, the lobes are moreover contiguous, whereas in the two other species, which are brought together in the series *Ecostatae*, the midrib is invisible and the internodes accordingly ecostate, and the lobes are separated from each other by a wide gap. Costate stipules are found also in some of the species belonging to the subgenus *Eu-streblosa*, but only in one of them, *Str. Johannes-Winkleri* Merr., the rib runs down along the stem. In the other species all the nerves arise from the angles of the stipule and converge towards the top of the undivided part, where they enter the lobes. As in many other genera belonging to this family, a fairly large number of colleters is found in the axils of the stipules. They are in this genus rather large.

The inflorescences are always of terminal origin, but by the development of a branch from the axil of one of the leaves at their base, they are, as stated above, soon pushed aside. They are, as a rule, shortly pedunculate, but in *Str. tortilis* the peduncle is about as long as the petiole of the leaf at its base, and in *Str. longiscapa* it is even about as long as the whole leaf. In these two species the peduncles are moreover erect, whereas they are in the other species of the subgenus *Eu-streblosa* recurved, and in those belonging to *Para-streblosa* patent.

The inflorescences themselves show various degrees of complexity. The simplest form is that found in *Str. bracteolata* Merr.: it consists of a single axis bearing at each node a sterile bract and a pair of flowers, one provided with a bract and the other ebracteate. The ebracteate flower might be regarded as a superposed one, and the whole inflorescence as a raceme, but it seems more plausible to regard the ebracteate flower as a terminal one, and the bracteate flower as representing one of the branchlets of a dichasium, the other branchlet forming the continuation of the axis (fig. 2). This interpretation is supported by two weighty arguments: (1) the ultimate ramifications of the inflorescences of the Psychotrieae are everywhere of the dichasial type, and there is therefore every reason to assume that those of *Streblosa* will be of the same or at least of a

related kind; (2) in almost all the other species of *Streblosa* the branchlets are at least partly arranged in pairs with a single flower in the fork between them, which means that they themselves are parts of a dichasium, and it is a well-known fact that the branchlets of a dichasium often develop into monochasia, whereas there are no fully authorized examples of dichasia developing into racemes or spikes. The flower-pairs are arranged in such a way that a line connecting the successive pairs would twine round the axis like the shoot of a winding plant. The arrangement of the flower-pairs, therefore, is cincinnate. The inflorescence, however, is not a simple cincinnus, for in a cincinnus we find but one flower at each node. For the same reason it is not exactly a monochasium, although we will use this term here for the sake of convenience, but more or less intermediate between the latter and the dichasium.

In *Str. bullata* Merr. the inflorescence is twice dichasially branched with rather long-pedicellate flowers in the forks, but after the second bifurcation

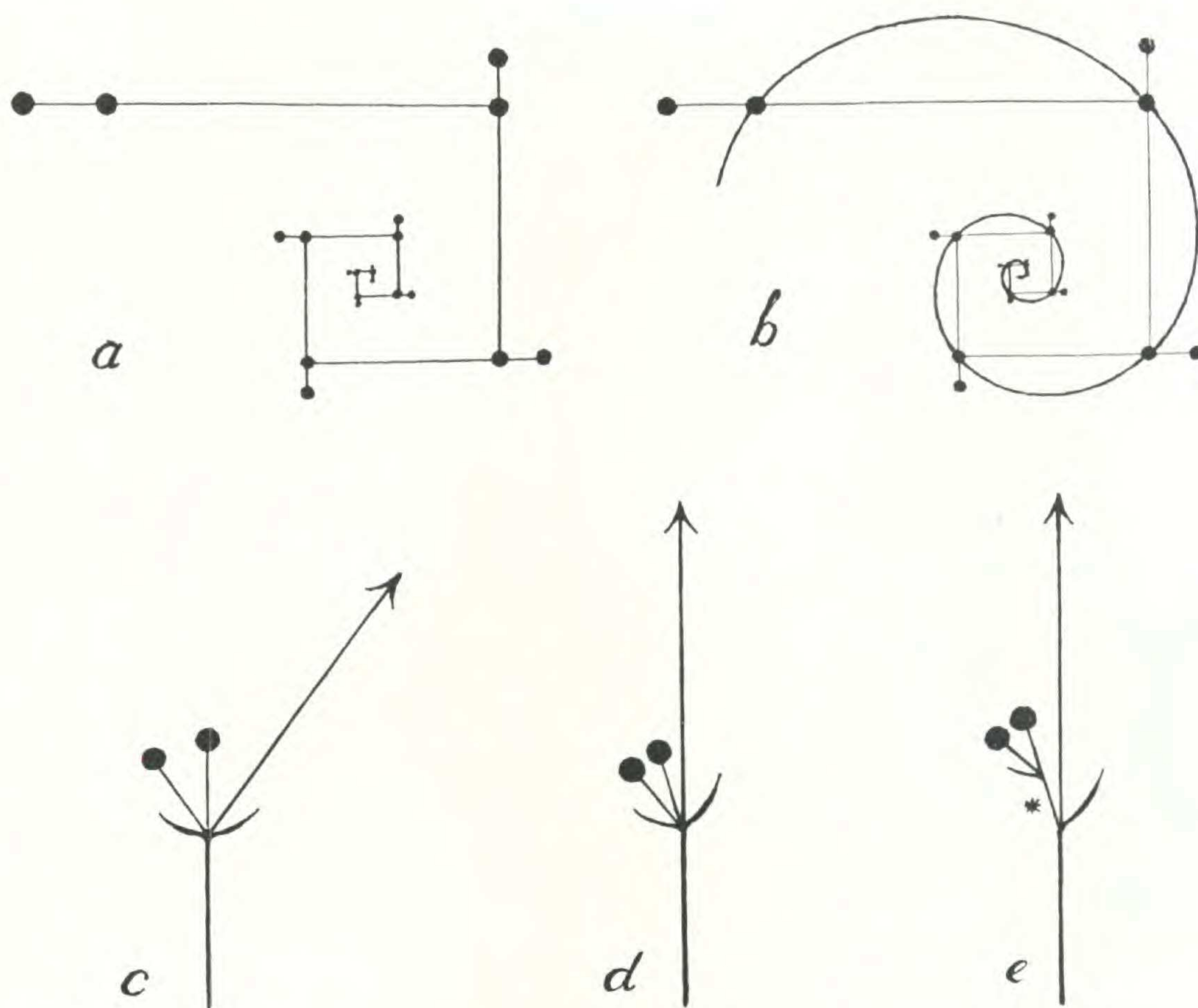


FIG. 2. Diagrams illustrating the structure of the monochasial branchlets. *a*. vertical projection; *b*. the same, but the terminal flowers connected by a spiral line representing the axis; this figure shows perhaps better than *a* why the lateral flowers do not stand before the terminal ones, but more or less beside them; *c*. the lateral shoot which is to form the continuation of the inflorescence axis in the position which theoretically it ought to have; *d*. the condition found in *Para-streblosa*; *e*. the condition found in *Eu-streblosa*; at * the "interbracteal" node.

the branchlets develop in the same way as the inflorescence of *Str. bracteolata*.

In the other species we find three or five subumbellately or, rarely, racemosely arranged branchlets, of which the lowest pair are sometimes in their turn provided with a pair of lateral branchlets; the main branchlets as well as those of the second order may be once dichasially ramified, but the prongs of these dichasia, or the branchlets themselves if they are unforked, are monochasial.

The monochasial structure of at least a part of the inflorescence, is a character of great taxonomic importance, for this arrangement is found nowhere else in the Psychotrieae.

It is in cymous inflorescences always somewhat difficult to make out how the terms bract, bracteole and pedicel should be used, but if we stick to the principle that the bud in the axil of a bracteole remains rudimentary, we may find a way out of the difficulty, for in this case the only hypsophylls to which the name could be applied, would be the ultimate ones in whose axils the flowers remain rudimentary, but as these hypsophylls are indubitably homologous with the other ones, there is obviously no reason to give them another name: in the cymous inflorescences there are therefore no bracteoles. When this is conceded, the determination of what should be called pedicel, offers no difficulty: in a dichasium it is obviously the axis which begins at the insertion of the dichasial prongs or at the insertion of the bracts in whose axils the latter develop. In a monochasium the base of the pedicel is accordingly recognizable at the insertion of the bract or of the bract-pair. In *Streblota* the matter is somewhat complicated by the circumstance that the two bracts which one would expect to find at the same height, are in reality often inserted at different heights. This means that between the two of them an extra internode has developed, which we will call the interbracteal internode. The shoot which forms the continuation of the axis of the monochasium develops always from the lower bract, which, as a rule, is somewhat larger than the other one, in whose axil the lateral flower develops. In the subgenus *Eu-streblota* the interbracteal internode is always easily recognizable, whereas in *Para-streblota* it is either absent or indistinct. In *Para-streblota* the flowers, moreover, are always subsessile, whereas in *Eu-streblota* subsessile flowers are met with in *Str. tortilis* and in *Str. microcarpa* only; in the other species they are distinctly pedicellate. Because of the presence of the interbracteate internode the flower-pairs of *Eu-streblota* give one the impression of being stipitate, and for the sake of convenience, this term has been used in the descriptions of the various species.

The flowers are always 5-merous and heterostylous. It is true that those of *Str. urticina* were described by Stapf as 4-merous, but this is a mistake: in the drawings on the plate accompanying his description they are correctly shown as 5-merous. They are as a rule very small. The largest ones which I could investigate, are those of *Str. bracteolata*, which reach a length of 9 mm.; in several other species they vary between 2.5

and 3.5 mm. Heterostyly is very often met with in the Psychotrieae and their allies; it occurs, for instance, also in the Hedyotideae. It is, however, no general feature of these tribes. The ovary is always bilocular and, as everywhere else in the Psychotrieae, each cell contains a single ovule ascending from the angle between the bottom of the cell and the septum.

The calyx consists of a short tube and five usually short, broadly triangular, ovate-triangular or suborbicular, rarely somewhat longer and then oblong, lobes, alternating with baculiform glands. The latter are like the previously mentioned raphides and the tendency to heterostyly a general feature of the Psychotrieae and of some of the related tribes, e.g. of the Hedyotideae. The aestivation of the calyx-lobes is usually more or less open or subvalvate; the large calyx-lobes of *Str. chlamydantha* Brem., however, are distinctly imbricate.

The corolla is always white, and consists of a short cylindrical or, in the upper half, above the insertion of the stamens, slightly widened tube and five spreading lobes, valvate in the bud. In the middle or somewhat above the middle the tube is provided with fairly long hairs. In *Eu-streblosa* the latter form a complete ring, whereas in *Para-streblosa* they are arranged in five bundles alternating with the stamens.

The stamens are inserted at the same height as the hairs. In the long-styled flower they are more or less included, and in the short-styled one exserted. The filaments are always glabrous, and the anthers oblong and dorsifixed. The pollen grains are small, globose, 3-porous and minutely reticulated.

The disk is, as a rule, fairly large, semi-globose or annular, and glabrous. At the top it shows a transverse impression corresponding in position with the septum in the ovary.

The style is thin and glabrous, and ends in two filiform or narrowly linear stigma-lobes. In the short-styled flower it is included, and the stigma-lobes are but slightly spreading, whereas in the long-styled flower it is exserted, and the stigma-lobes are more distinctly spreading and at the top sometimes recurved.

The fruits are very small, smaller, in fact, than anywhere else in this tribe, and in size and shape more like those of *Hedyotis*, *Lerchea* or *Xanthophytum* than like the drupes of the other Psychotrieae. They are either globose or, more often, didymous, crowned by the persistent calyx and the somewhat shrunken disk, and they remain always green. When fully ripe, they split into two drupaceous mericarps, which in the herbarium are distinctly costate, but in the fresh condition smooth. The mesocarp is but weakly developed, and the endocarp too is thin. The pyrenes vary in colour between yellowish, red and almost black, and they are usually 5-ribbed, three of the ribs ornamenting the convex side, and the two others marking the border of the latter; the flat inner side shows in the centre an excavation, which a more or less distinct keel divides into two parallel or upwards somewhat divergent hollows. The keels may be

acute or obtuse, and the excavation on the flat side varies in the various species somewhat in size and shape, but the differences are difficult to describe, and they are therefore not mentioned in the descriptions. The seed shows exactly the same sculpture as the pyrene, and consists of a thin, red or red-dotted testa and a uniform horny endosperm. The embryo is small and nearly straight, and the radicle points downwards.

The shape and sculpture of the pyrene, and the way in which the testa surrounds and eventually penetrates the endosperm, are important diagnostics for the genera belonging to the *Psychotria* group. *Streblosa* is for instance easily distinguishable from *Mapouria* Aubl., to which the type-species was referred by Hooker in Benth. & Hook. f., Gen. Pl., by the presence of the two contiguous hollows on the ventral side of the pyrene, and from *Psychotria* L. in the delimitation in which it is taken by me (cf. Brem. in Jour. Bot. 71: 273. Oct. 1933, and in Pulle's "Flora of Suriname" 4: 261. 1934) by the absence of the median groove on the ventral side of the pyrene and the corresponding intrusion of the testa into the seed. Apart from the difference in size, the pyrenes of *Streblosa*, however, are very similar to those of *Geophila* Don; the fruits of the latter, on the other hand, are not only larger but also more fleshy, and coloured instead of green. The pyrenes of *Notopleura*, the genus which resembles *Streblosa* in habit, are dorsiventrally compressed, and their ventral side is either entirely flat or provided with a protruding ridge, but the latter does not arise from the bottom of a cavity. Of these plants too the fruits are coloured and larger and more fleshy than those of *Streblosa*.

Within the genus *Streblosa* itself two slightly different kinds of fruit are met with. In the subgenus *Eu-streblosa* and in *Str. chlamydantha* and *Str. longiscapa* the mericarps are nearly globose, and the fruits therefore didymous, but in the other species of *Para-streblosa* the mericarps are semi-globose, and the fruits accordingly globose: in herbarium material the latter are 8-ribbed, whereas the didymous fruits are either 6- or 10-ribbed. In the species which are normally provided with didymous fruits, occasionally some globose ones are found; the latter are 5-ribbed and owe their aberrant shape to the abortion of one of the mericarps.

CLASSIFICATION OF THE SPECIES¹

The genus has here been divided into two subgenera. In *Eu-streblosa* the stipules are wider than the stem, and their basal part is more strongly developed than the lobes, the flower-pairs are distinctly stipitate, i.e. the interbracteate internode is always developed, the hairs in the corolla-tube form a complete ring, and the fruits are always didymous. In *Para-streblosa*, on the contrary, the stipules are not wider than the stem, and their lobes are better developed than the basal part, the flower-pairs are

¹ The abbreviations for the herbaria of the institutions cited in this paper are as follows: AA = Arnold Arboretum; BZ = Buitenzorg Botanic Garden; HBG = Inst. Allg. Bot., Hamburg; K = Royal Botanic Gardens, Kew; NY = New York Botanical Garden; U = Bot. Mus. Utrecht.

subsessile, i.e. the interbracteate internode is either absent or but indistinctly developed, the hairs in the corolla-tube are arranged in five bundles, and the fruits are usually globose; didymous fruits, however, are found in *Str. chlamydantha* and in *Str. longiscapa*.

A further subdivision of *Eu-streblosa* does not lead to results which are of practical value, the groups becoming too small. The first two species, *Str. tortilis* (Bl.) Khs. and *Str. microcarpa* Ridley with their subsessile flowers, are doubtless nearly related, but *Str. lampongensis* Brem., a species with distinctly pedicellate flowers, shows in the structure of its stipules with their comparatively long lobes, an unmistakable likeness with these two species. The next three species, *Str. bracteata* Ridl., *Str. myriocarpa* Merr. and *Str. maxima* Brem., form another natural group, characterized by large leaves and very large, oblong or obovate stipules. Ovate or ovate-lanceolate stipules provided with a prominulous or prominent midrib characterize a group of Bornean species, to wit *Str. Johannis-Winkleri* Merr., *Str. bullata* Merr. and *Str. bracteolata* Merr., to which the less known species *Str. multiglandulosa* Merr. and *Str. undulata* Khs. interpr. Val. probably also belong. A somewhat isolated position is occupied by *Str. anambasica* Brem.; in the small size of the flowers it resembles the Sumatran species which form the next group, but it differs conspicuously from this group by the more strongly ramified inflorescences. The five Sumatran species, *Str. deliensis* Brem., *Str. hypomalaca* Brem., *Str. leiophylla* Brem., *Str. polyantha* Khs. and *Str. scabridula* Brem., are provided with ecostate stipules, and possess inflorescences with three undivided branchlets and very small flowers.

In *Para-streblosa* two series may be distinguished: the *Costatae* with conspicuously costate stipules and bicostate internodes, and the *Ecostatae* with ecostate stipules and smooth internodes; in the first series the stipular lobes are contiguous, whereas in the second they are separated from each other by a wide gap. The first are confined to Borneo, whereas the second group is found in Palawan and other islands of the Philippines. The latter comprises at present but two species, one consisting of two, and the other of three varieties, but it is not impossible that further study will show that these varieties are sufficiently distinct to be regarded as species. Among the *Costatae*, *Str. chlamydantha* Brem. and *Str. longiscapa* Brem. occupy a more or less isolated position. They are provided with didymous fruits, and their calyx-lobes are larger than in the other species.

KEY TO THE SPECIES

- a. The undivided part of the stipules wider than the stem and at least 2 mm. high, but, as a rule, much higher. Hairs in the corolla-tube in a complete ring. Fruits always didymous. — Species from the Malay Peninsula, Sumatra, Java and Borneo.

Eu-streblosa

- b. Stipules with an ovate base and two slightly spreading lobes, which are longer than the base. Flowers either sessile or pedicellate, but the pedicels never more than 0.6 mm. long.

- c. One of the flowers of each pair sessile; the pedicel of the other one not more than 0.3 mm. long (pedicels of the flowers in the forks of the dichasia somewhat longer).
- d. Leaves ovate or ovate-elliptic, less than twice as long as wide, and rarely more than 10 cm. long; on the underside lepidote. Peduncle about as long as the petiole of the preceding leaf. The larger floral bracts about 1 mm. long. — Java and West Sumatra.....1. *Str. tortilis*.
- d: Leaves lanceolate- or oblong-elliptic, more than twice as long as wide, and nearly always more than 10 cm. long; not lepidote on the underside. Peduncle much shorter than the petiole of the preceding leaf. The larger floral bracts at least 1.2 mm. long. — Malay Peninsula and Sumatra.....2. *Str. microcarpa*.
- c: All flowers distinctly pedicellate; the pedicels about 0.6 mm. long. — South Sumatra.....3. *Str. lampongensis*.
- b: Stipules ovate, obovate or oblong in outline; the incision between the two lobes not reaching beyond the centre. Flowers always pedicellate, and the pedicels always more than 0.6 mm. long.
- e. Leaves at least 15 cm. long. Stipules oblong or obovate. — Bornean species.
- f. Stem glabrous. Leaves slightly pubescent on the midrib beneath. — West Borneo.....4. *Str. bracteata*.
- f: Stem densely rufous-pubescent. Leaves on the underside on midrib, nerves and venules densely pubescent.
- g. Petioles 1–2 cm. long; blade 15–26 cm. \times 7–13 cm., subobtusely, provided with about 20 pairs of nerves. Midrib of the stipules indistinct. — West Borneo.....5. *Str. myriocarpa*.
- g: Petioles 2–8 cm. long; blade 25–30 cm. \times 11–12 cm., caudate-acuminate, provided with 11–15 pairs of nerves. Midrib of the stipules prominent and pilose. — North Borneo.....6. *Str. maxima*.
- e: Leaves less than 15 cm. long. Stipules ovate or ovate-lanceolate.
- h. Stipules provided with a prominulous or prominent midrib. — Bornean species.
- i. Leaves on the upper side dotted with bulging resin cells. — North Borneo.....7. *Str. multiglandulosa*.
- i: Leaves not dotted with resin cells.
- j. Leaves lanceolate, all or at least the majority more than 12 cm. long.
- k. Internodes distinctly bicostate. Leaves with about 9 pairs of nerves; on the underside very sparsely pubescent. Stipules ovate, 7–9 mm. wide. — West Borneo.....8. *Str. Johannis-Winkleri*.
- k: Internodes ecostate. Leaves with about 12 pairs of nerves; on the underside, especially on the nerves, sparsely villosulous. Stipules ovate-lanceolate, 6 mm. wide. — South-east Borneo.....9. *Str. undulata*.
- j: Leaves relatively wider and less than 12 cm. long.
- l. Inflorescence twice dichasially ramified. Leaves obtuse or subobtusely and conspicuously bullate. — West Borneo.....10. *Str. bullata*.
- l: Inflorescence unbranched. Leaves shortly acuminate, plane. — West Borneo.....11. *Str. bracteolata*.
- h: Stipules not provided with a distinct midrib. — Species from the Anambas Islands and Sumatra.
- m. Inflorescence with five main branchlets; the lower pair once forked; in the fruiting stage increasing to about twice the original size. — Anambas Islands.....12. *Str. anambasica*.
- m: Inflorescence with three branchlets; all branchlets simple; in the fruiting stage not conspicuously larger than before. — Sumatran species.
- n. Stipules ovate-lanceolate, divided nearly to the middle. — East Sumatra.13. *Str. deliensis*.

- n: Stipules ovate-orbicular, divided for not more than one-third.
 - o. Stipules less than 5 mm. wide. None of the petioles more than 2 cm. long. — Mentawai Islands.....14. *Str. hypomalaca*.
 - o: Stipules more than 10 mm. wide. The lower petioles more than 2 cm. long.
 - p. Stems and leaves completely glabrous. — Mentawai Islands.15. *Str. leiophylla*.
 - p: Stems and both sides of the leaves villous or hirsute.
 - q. Leaves on the upper side dotted with bulging and in herbarium material blackened resin cells, and on both sides sparsely villous, provided with 9–10 nerve pairs. Pyrenes black. — West Sumatra.....16. *Str. polyantha*.
 - q: Leaves not dotted with resin cells, on both sides scabridly hirsute, provided with 12–13 pairs of nerves. Pyrenes red. — East Sumatra.....17. *Str. scabridula*.
- a: The undivided part of the stipules of the same width as the stem and less than 2 mm. high. Hairs in the corolla-tube in bundles. Fruits either didymous or globose. — Species from Borneo and the Philippines.

Para-streblosa

- r. Stipules costate and the lobes contiguous. Internodes bicostate. — Bornean species.

Costatae

- s. Bracts obovate, longer than the flowers. Calyx 1.2 mm. high; lobes ovate-oblong, very unequal in size, imbricate. — East Borneo.....18. *Str. chlamydantha*.
- s: Bracts ovate, lanceolate or linear, shorter than the flowers. Calyx at the most 0.8 mm. high; lobes ovate or triangular, equal, never overlapping.
 - t. Peduncle as long as or nearly as long as the preceding leaf. Calyx divided nearly to the base; lobes ovate, 0.6 mm. long. Fruits didymous. — East Borneo.....19. *Str. longiscapa*.
 - t: Peduncle much shorter than the preceding leaf. Calyx-lobes triangular, not more than 0.4 mm. long. Fruits globose.
 - u. Leaves linear-lanceolate, lanceolate or lanceolate-oblong; raphides at the underside in herbarium material easily distinguishable. Bracts early deciduous.
 - v. Leaves linear-lanceolate, 10–16 cm. \times 2.0–3.3 cm. Peduncle not more than 4 mm. long. — West Borneo.....20. *Str. lanceolata*.
 - v: Leaves lanceolate or lanceolate-oblong, 11–16 cm. \times 4–6 cm. Peduncle 1.2–1.5 cm. long. — North Borneo.....21. *Str. urticina*.
 - α . Stem, petioles and, in young leaves, midrib and nerves puberulous; peduncle densely puberulous. — North Borneo.....var. *Stapfi*.
 - α : All parts glabrous. — North Borneo.....var. *glabrescens*.
 - u: Leaves elliptic; raphides never easily distinguishable. Bracts subsistent.
 - w. Basal part of the stem about 3 mm. thick. Leaves 14–17 cm. \times 8–10 cm., with about 10 pairs of nerves. Corolla 3.2 mm. long. — North and East Borneo.....22. *Str. glabra*.
 - w: Basal part of the stem about 7 mm. thick. Leaves 17–27 cm. \times 8.5–12 cm., with about 13 pairs of nerves. Corolla 6 mm. long. — West Borneo.....23. *Str. assimilis*.
- r: Stipules ecostate and the lobes separated from each other by a wide gap. Internodes ecostate. — Species from Palawan and the other Philippines.

Ecostatae

- x. Internodes without grooves. Stipular lobes linear, 1.5–1.8 mm. long; the gap rectangular. Corolla 3.5 mm. long. — Palawan.....24. *Str. palawanensis*.

- β . Leaves in herbarium material olivaceous, on the upper side nitidulous; raphides on the underside here and there visible. — Palawan.....var. *Merrillii*.
- β : Leaves in herbarium material brown, on both sides dull; raphides nowhere distinguishable. — Palawan.....var. *Elmeri*.
- α : Internodes with two longitudinal grooves. Stipular lobes semi-triangular, 6–7 mm. long and at the base 3 mm. wide; the gap with rounded corners. Corolla 2 mm. long. — Luzon, Catanduanes and ?Samar.....25. *Str. axilliflora*.
- γ . Inflorescences even in the fruiting stage not more than 1.5 cm. in diam.
- δ . Leaves lanceolate-elliptic, 10–14 cm. \times 4.2–5.4 cm. — Luzon.....var. *angustifolia*.
- δ : Leaves elliptic, 8 cm. \times 5.5 cm. — Luzon.....var. *latifolia*.
- γ : Inflorescences in the fruiting stage up to 3.5 cm. in diam. — Catanduanes.....var. *laxiflora*.

Subgenus *Eu-streblosa*

Stipulae magnae; pars basalis caule latior. Bracteeae cuiusque paris diversa altitudine insertae. Corollae tubus intus annulo completo pilorum instructus. Fructus semper didymus. — Species 1–17, in Peninsula Malayana, Sumatra, Java et terra Borneënsi endemicae.

1. *Streblosa tortilis* (Bl.) Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851, var. β excl.; Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 211. 1869; Val. in Ic. Bog. 4: 139, t. 343. 1912; Koorders-Schuhmacher, Syst. Verz. 1 (1): 105. 1912.
- Psychotria tortilis* Bl., Bijdr. Fl. Ned. Ind. 958. 1826; Miq., Fl. Ind. Bat. 2: 294. 1857, Suppl. 223. 1860; Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 124, 125. 1873, syn.
- Psychotria microcarpa* Wall. excl.; Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1891; Koorders, Exkursionsfl. Java 3: 268. 1912. Non Hook. f., Fl. Brit. Ind. 3: 169. 1880; nec King & Gamble in Jour. As. Soc. Beng. 72 (2): 11. 1906; nec Ridl. in Jour. As. Soc. Straits 57: 62. 1911, quae est *Str. microcarpa* Ridl.

Caulis ascendens, 10–20 cm. altus, ad apicem 2–2.5 mm. diam., basi plerumque usque ad 3 mm. incrassatus, primum pilis rufis puberulo-pubescent, deinde glabrescent, internodiis primum bisulcatis, deinde teres, cortice rubro-striatulo vestitus, basin versus lignescens et ibi libero crassiore rubro-striatulo munitus; pars decumbens radicans. Folia petiolo supra glabro et subtus puberulo-pubescente, plerumque conspicue rubro-striatulo, 1–3.5 cm. longo instructa; lamina ovata vel ovato-elliptica, 3.5–11 cm. longa et 2.5–7.2 cm. lata, apice acuta vel subacuta, basin versus rotundata, prope petiolum tamen subito contracta, opaca, supra primum dense scabridula, mox glabrescente et plerumque cellulis resiniferis rubris, sicc. nigrescentibus dense punctata, sicc. saturate brunnea vel badia, subtus costa nervis venulis primum pilis rufis dense puberulo-pubescent, deinde parcius substrigosa, inter venulas albido-lepidota, sicc. dilute brunnea vel albida, raphidibus distincte lineolata, costa subtus plerumque distincte rubro-striatula, mesophyllo plerumque cellulis resiniferis marmorato, nervis utroque latere costae 8 vel 9 utrimque prominulis, venulis utrimque distinguendis. Stipulae e basi ovata, 5–8 mm. lata in lobos duos angustos et acutissime exeuntes, plus minusve divergentes, 3–5 mm. longos contractae, ad basin pubescentes et margine fugaciter ciliolatae, ceterum glabrae. Inflorescentiae pedunculo erecto, petiolo folii praecedentis subaequilongo, gracili, pubescente instructae; ramuli 5 subumbellati,

primum breves, post anthesin usque ad 3 cm. elongati, plerumque semel dichasiales, pubescentes. Bractee ramulorum triangulares, 3–5 mm. longae, rubro-striatulae, margine ciliatae, subliberae; bractee florales inaequales, cuiusque pars inferior late ovata, 1 mm. longa, superior angustior, 0.8 mm. longa, ceterum ut bractee ramulorum. Flores furcis dichasiorum inserti pedicello 0.6 mm. longo instructi; aliorum pedicelli 0.1 mm. longi; florum pares stipite 0.2–0.3 mm. longo elati. Calyx 1 mm. altus, lobis ovato-triangularibus tubo duplo longioribus, rubro-striatulis. Corolla 3.7 mm. longa, tubo dimidio superiore subcampanulato. Fructus rubro-maculatus, primum pubescens, deinde glabrescens; pyrenae rubro-brunneae.

Habitat silvas Javae praesertim partis occidentalis et Sumatrae Occidentalis.

JAVA: Bantam Res.: Nando Badak, *Blume s.n.* (L), f. longistyla, et G. Seribu, *Blume 893* (L), f. brevistyla (in eodem folio fixae), *TYPE*, dupl. U. Buitenzorg Res.: G. Djambu near Leweliang, alt. 250 m., *Bakhuizen v. d. Brink 5248* (BZ, L); ibidem, *Bakhuizen v. d. Brink Jr. 855* (U); G. Tjibodas near Tjampea, alt. 200 m., *Hallier 461* (BZ, L); G. Burung (G. Bunder), alt. 200–300 m., *Schiffner 2709* (L); Pasir Ipi near G. Parungpung, alt. 750 m., *Bakhuizen v. d. Brink 7293* (BZ, L).

SUMATRA: Galangankwo near Ginteng, *Korthals s.n.* (L): leaves somewhat smaller than in the type (5.5–7 cm. \times 3–4.3 cm.), but otherwise apparently not different.

The exact locality of the plant collected by Korthals in Sumatra, is unknown to me: that quoted above, is the one given by Korthals in his paper in *Ned. Kruidk. Arch.* 2 (2): 246, but a label attached to the specimen in the Leiden herbarium and written by Korthals himself, is inscribed: P. Genting.

A specimen collected by Koorders in Banjumas (Central Java), has leaves which are much larger than those of the type (up to 14.5 cm. \times 9 cm.), and are not dotted with resin cells, but are like those of the type provided with 8 or 9 pairs of nerves. The position of this specimen is somewhat uncertain: provisionally I refer it to the species described above, but more material from the same region will have to be investigated before a definite conclusion can be drawn. Koorders-Schuhmacher l.c. quotes a specimen (*Koorders 23565* BZ) collected in the Malang Residency at Sumber Tangkil. It remains to be seen whether this really is conspecific.

In some of the specimens, e.g. in *Blume 893*, anomalous inflorescences are seen in which the branchlets are replaced by somewhat impoverished, but otherwise normal inflorescences.

The roots on the decumbent part of the stem are not confined to the nodes, but spread over the whole length of the internodes. *Schiffner 2709* shows young plants springing from the decumbent part: one of them is already rooting at the base.

Streblosa tortilis comes very near to *Str. microcarpa*, with which it was confused by Hooker l.c. In the shape of the stipules and in the structure of the inflorescence with its five forked branchlets and sessile flowers and in the usually conspicuously dotted upper side of the leaves there is a close resemblance, but *Str. tortilis* is a much smaller plant, the stem

rarely exceeding 20 cm. in height and the leaves rarely 10 cm. in length; the leaves, moreover, are ovate or ovate-elliptic and acute or subacute instead of elliptic and more or less distinctly acuminate, and they are lepidote on the lower side, and the peduncle is erect and about as long as the petiole of the leaf at its base, instead of much shorter and recurved. With *Str. lampongensis* too it shows an unmistakable affinity, for instance in the shape of the stipules and in the development of a rather thick secondary bast streaked with red resin cells in the basal part of the stem, but this species has distinctly pedicellate flowers and its leaves are not dotted with resin cells on the upper side. Groups of resin cells in the secondary bast are not confined to these three species, but are found also in *Str. myriocarpa* and in *Str. maxima*, and perhaps in the related species *Str. bracteata* and *Str. multiglandulosa*, but of these I had no material at my disposition, and the original descriptions make no mention of this character. An epidermis dotted with resin cells on the upper side of the leaves, is a much less common feature than the presence of resin cells in the cortex and in the secondary bast. In this respect *Str. tortilis* is matched only by *Str. microcarpa* and probably by *Str. multiglandulosa*, and further by the but distantly related *Str. polyantha*. These resin cells are not always easily distinguishable, probably because the production of resin varies according to circumstances, and as the cells, in which the resin is deposited, are in shape and size indistinguishable from the ordinary epidermis cells, it is easily conceivable that they are not always conspicuous.

2. *Streblosa microcarpa* Ridl., Fl. Mal. Pen. 2: 148. 1923. Non Ridl. in Kew Bull. 1926: 70. 1926, quae est *Str. leiophylla* Brem.

Streblosa Wallichii Merr. in Papers Mich. Acad. Sci. 23: 194. 1938, n. nom. illeg.

Psychotria tortilis Bl. in errore apud Hook. f., Fl. Brit. Ind. 3: 169. 1880; King & Gamble in Jour. As. Soc. Beng. 72 (2): 11. 1906; Ridl. in Jour. As. Soc. Straits 57: 62. 1911.

Streblosa puberula Merr. in Papers Mich. Acad. Sci. 23: 195. 1938.

Caulis ascendens, 20–60 cm. altus, ad apicem 1.5–2 mm. diam., basi usque ad 5 mm. accrescens, internodiis primum bisulcatis, deinde teres, cortice rubro-striatulo vestitus, basin versus lignescens et ibi libero crassiore rubro-striatulo munitus. Folia petiolo supra glabro, subtus primum densius, deinde sparsius puberulo-pubescente, 1.5–5 cm. longo instructa; lamina elliptica, 10–23 cm. longa et 4.5–9.5 cm. lata, apice acuta vel acuminate, basi contracta, supra nitidula, primum minute scabridulo-papillosa, deinde glabrescens, plerumque cellulis resiniferis rubris, sicc. nigrescentibus dense punctata, sicc. olivaceo-brunnea, subtus praesertim costa nervis venulis primum pilis rufis dense puberulo-pubescentibus, deinde sparsius pubescens et inter venulas glabrescens, haud lepidota, sicc. pallide viridis vel interdum dilute rubro-brunnea, raphidibus inconspicuis, nervis utroque latere costae 10–15, venulis utrimque distinguendis. Stipulae e basi ovata 4–6 mm. lata in lobos duos angustos et acutissime exeuntes, plus minusve divergentes, 3.5–7 mm. longos contractae, margine scabridulae, ceterum glabrae. Inflorescentiae pedunculo recurvato, puberulo-pubescente, 4–5 mm. vel raro usque ad 10 mm. longo instructae; ramuli 5 subumbellati, primum breves, post anthesin usque ad 1.5 cm. elongati,

pubescentes, infimi iterum ramulis duobus lateralibus instructi, alii semel dichasiales. Bracteae ramulorum triangulares, 3–5 mm. longae, rubro-striatulae, margine ciliatae, basi late connatae; bracteae florales inaequales, cuiusque paris inferior 1.5–2.5 mm., superior 1.2–1.7 mm. longa, ceterum ut bracteae ramulorum. Flores furcis dichasiorum inserti distincte pedicellati, alii subsessiles; florum pares stipite 0.1–0.3 mm. longo elati. Calyx 0.7–1 mm. altus, lobis ovato-orbicularibus tubo fere duplo longioribus, rubro-striatulis. Corolla 2.4–3 mm. longa, tubo dimidio superiore subcampanulato. Fructus plerumque rubro-maculatus, primum pubescens, deinde glabrescens; pyrenae rubrae vel nigrescentes.

Habitat Peninsulam Malayanam et Sumatram.

MALAY PENINSULA. Penang, *Wallich* Herb. no. 8344, TYPUS (exemplum vidi in Herb. Gray.); Perak (cf. *Ridl.* ll.cc.).

SUMATRA. Djambi Res.: S. Mengopih, *Rutten-Kooistra* 3 (U) "very common." East Coast Govt.: Asahan, Silo Maradja, alt. 40–60 m., *Bartlett* 8686 (NY). H. Bagasan, *Rahmat* 6429 et 6543 (AA). Tapianuli Res.: Padang si Dimpuan, alt. 30–250 m., H. Imbaru, *Rahmat* 4636 (NY); Aek Roppak, *Rahmat* 4675, 4775 (NY); Si Harehare Djae, *Rahmat* 5000 (NY, TYPE of *Str. puberula* Merr., AA); Sopsopan an Aek si Olip, *Rahmat* 5101 (NY). Govt. Atjeh and Dependencies: Country of the Gajo, between Aer Panas and Reoma Bundar, near milestone 66/67, alt. 1000 m., *v. Steenis* 10070 (BZ). West Coast Res.: G. Malintang, N.W. slope, alt. 1150 m., *Bünnemeyer* 3529 (BZ).

The specimens collected by *Bünnemeyer* on the G. Malintang in West Sumatra, differ from the type in the absence of the dots caused by the resin cells in the epidermis of the leaves, the slightly longer peduncles (up to 10 mm. long), the nearly estipitate flower-pairs, the slightly larger size of the flowers and the nearly black pyrenes. The material is, owing to the development of mould during the process of drying, in a very bad condition.

King & Gamble l.c., cite under their *Psychotria tortilis* a specimen collected in South Sumatra by *Forbes* (1495), which I have not seen, and whose position, therefore, remains uncertain: it may have belonged to the real *Streblosa tortilis* or to *Str. lampongensis*.

Merrill, l.c., rejected Ridley's name for this species because the specific epithet was adopted from *Psychotria microcarpa* Wall., which he regards as an illegitimate name because there exists an earlier homonym. In reality, however, it is a manuscript name, which means that it is to be regarded as non-existent. As the plant, therefore, had no legitimate name, Ridley was free to choose whatever name he wished.

The differences between *Str. microcarpa* and *Str. tortilis* have been given above. In general aspect it is perhaps more like *Str. lampongensis*, which it resembles in height and in the shape and size of the leaves, but from which it is easily distinguishable by the subsessile flowers.

3. *Streblosa lampongensis* Brem. n. spec.; TYPUS: *Ibut* 29 (L).

Caulis probabiliter circ. 40 cm. altus, sed pars basalis speciminum investigatorum non conservata et habitus inde non bene notus; interdum pseudo-dichotome furcatus; ad apicem 1.5 mm. diam., basi usque ad 5 mm. incrassatus, internodiis primum bisulcatis, sicc. longitudinaliter

rugosis, deinde teres, cortice fusco, rubro-striatulo vestitus, basin versus lignescens et ibi libero crassiore sed haud rubro-striatulo munitus. Folia petiolo subtus primum pilis rubris puberulo, mox glabrescente, 1.5–5 cm. longo instructa; lamina foliorum superiorum ovato-elliptica, 10–16 cm. longa et 5.5–9.5 cm. lata, apice acuta vel subacuminata, basi rotundata sed prope petiolum subito contracta, foliorum inferiorum lanceolato-oblonga, 13–15 cm. longa et 5–5.5 cm. lata, apice basique attenuata, omnium supra nitidula vel opaca, sicc. supra saturate et subtus dilute rubro-brunnea, primum subtus costa nervisque pilis rubris crispatis dense puberulo-pubescent, deinde plus minusve glabrescent, haud lepidota, raphidibus inconspicuis, nervis utroque latere costae 11–14, venulis utrimque distinguendis. Stipulae e basi ovata, 5–6 mm. lata in lobos duos angustos et acutissime exeuntes, plus minusve divergentes, 4 mm. longos contractae. Inflorescentiae pedunculo recurvato, sparse hirtello, 5–8 mm. longo instructae; ramuli 5 subumbellati, infimi iterum ramulis duobus lateralibus instructi et postea ut ramuli alii semel dichasiales, sparse hirtelli, primum breves, post anthesin usque ad 2 cm. elongati. Bracteae ramulorum triangulares, uno latere lobo stipulari triangulari instructae, 4–5 mm. longae, costa carinatae, subglabrae; bracteae florales ovatae, inaequales, cuiusque paris inferior 1.5 mm. longa, superior minor, hirtellae. Florum pares stipite sparse hirtello 0.6 mm. longo elati; flores pedicellati; pedicelli sparse hirtelli, 0.5–0.6 mm. longi. Calyx 0.7 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 2.2 mm. longa, tubo dimidio superiore subcampanulato. Fructus subglaber; pyrenae rubrae.

Habitat Sumatram Australem.

SUMATRA. Lampong Districts: slope of G. Rate Telangaran, alt. 400 m., *Ibut* 29 (L, TYPUS), (U, dupl. typi).

It is not impossible that *Forbes* 1495, which was collected in the same region, will prove to belong to this species. As stated above, it was referred by King & Gamble to their *Psychotria tortilis*.

A noteworthy feature of the specimens described above is that they are partly pseudo-dichotomously forked. This means that in this species occasionally both the axillary buds at the base of the peduncle develop into a shoot. The same phenomenon has been observed in *Str. chlamydantha* and in *Str. longiscapa*.

Streblosa lampongensis resembles the two preceding species in the shape of the stipules, the thick layer of secondary bast and the five main branchlets of the inflorescence, but it differs conspicuously from them in its distinctly pedicellate flowers. In this respect it resembles the following species, in which the pedicels, however, are much longer and the bracts much larger, and whose stipules are provided with a larger undivided part and shorter, not diverging lobes.

4. *Streblosa bracteata* Ridl. in Jour. As. Soc. Straits 57: 64. 1911.

Caulis plus quam 45 cm. altus, glaber, basin versus lignescens et ibi usque ad 6 mm. incrassatus. Folia petiolo 2.5–3.2 cm. longo instructa; lamina ovato-lanceolata, 15–17.5 cm. longa et circ. 10 cm. lata, apice subacuta, basi contracta, supra glabra, subtus costa pilis crispatis parce pubescens, nervis utroque latere costae 20. Stipulae magnae ambitu oblongae, bifidae, lobis acuminatis 12 mm. longis, glabrae. Inflorescentiae

pedunculo 12 mm. longo, pilis crispatis pubescente instructae; ramuli pauci. Bracteae florales oblongae, obtusae, glabrae, flore longiores. Flores pedicellati; pedicelli flore longiores, pubescentes. Calyx lobis breviter ovatis. Corolla nondum nota. Fructus glaber.

Habitat terrae Borneënsis partem occidentalem.

BORNEO. Sarawak, Jambusan, *Ridley 12437* n.v.; Bau, *Ridley 11741* n.v.

The description given above has been adapted from the original. Ridley ascribes to the midrib of the leaves and to the peduncle a "scurfy" pubescence, which, as scales are unknown in this genus, I have interpreted as a pubescence caused by curled hairs. This is in accordance with what in other species is found. On account of the large oblong stipules and the numerous lateral nerves I have placed it in the neighbourhood of *Str. myriocarpa*, from which it should be easily distinguishable by the glabrous stem, the nearly glabrous leaves, and glabrous stipules and by the somewhat longer peduncle. Unfortunately no material was available to me for study.

5. *Streblosa myriocarpa* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 296. 1937.

Caulis circ. 30 cm. altus; pars basalis speciminum investigatorum non conservata et habitus inde non bene notus; ad apicem 4 mm. diam., basi usque ad 9 mm. incrassatus, primum pilis rufis crispatis dense pubescens, internodiis primum complanatis et bisulcatis, deinde teres, basin versus lignescens et ibi libero crassiore dense ferrugineo-striatulo vestitus. Folia petiolo subtus primum pilis rufis dense, deinde sparsius puberulo-pubescente, 1–2 cm. longo instructa; lamina oblongo-elliptica, 15–26 cm. longa et 7–13 cm. lata, apice subobtusa, basi contracta, opaca, sicc. supra olivaceo-brunnea, subtus dilute brunnea, supra glabra, subtus costa nervis venulis pilis primum rubro-brunneis, deinde ferrugineis dense puberulo-pubescentis, lepidota, raphidibus distinguendis, nervis utroque latere costae circ. 20, nervis venulisque pro genere densius reticulatis subtus prominentibus. Stipulae ambitu obovatae, 2.5 cm. longae et latae, bifidae, lobis late et oblique triangularibus 1.2 cm. longis contiguis, margine ciliolatae, extus ubique sparse puberulae, sicc. saturate rubro-brunneae, costa indistincta. Inflorescentiae pedunculo recurvato, ferrugineo-puberulo, circ. 7 mm. longo instructae; ramuli 5 subumbellati, plerumque omnes semel dichasiales, pilis ferrugineis puberulo-hirtelli, primum circ. 1.1 cm., deinde usque ad 1.6 cm. longi. Bracteae ramulorum plus minusve involucrantes, ovatae acuminatae, 7–12 mm. longae et 3.5–8 mm. latae, subglabrae; bracteae florales ovato-triangulares, inaequales, cuiusque paris inferior 2 mm., superior 1.5 mm. longa. Florum pares stipite 1 mm. longo, sparse puberulo-hirtello instructi. Flores pedicellati; pedicelli 2.7–3 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla nondum nota. Fructus vix distincte puberulus; pyrenae luteo-rubrae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Schwaner Mts., Bukit Mulu, alt. 700 m., *Winkler 452* (HBG, TYPUS); Upper Kapuas Mts., Bukit Obat, *Winkler 1334* (HBG), n.v.

The affinity which I suppose to exist between this species and *Str. bracteata* has been discussed already. From the doubtless nearly related *Str. maxima* it differs in the shortness of the petioles, the subobtuse, on

the underside ferrugineous-puberulous leaves with their more numerous nerves and denser reticulation, and the larger size of the bracts subtending the branchlets of the inflorescence.

6. *Streblosa maxima* Brem. n. spec.; TYPUS: *Amdjah*, Exped. v. *Genderen Stort* 283 (BZ).

Caulis circ. 50 cm. altus; pars basalis speciminum investigatorum non conservata et habitus inde non bene notus; ad apicem 4 mm. diam., basi usque ad 9 mm. incrassatus, primum pilis rufis crispatis dense pubescens, internodiis primum complanatis et bisulcatis, deinde teres, basin versus lignescens et ibi libero crassiore dense rubro-striatulo vestitus. Folia petiolo subtus pilis rufis primum dense, deinde sparsius puberulo-pubescente, 2–8 cm. longo instructa; lamina elliptica, 25–30 cm. longa et 11–12 cm. lata, apice caudato-acuminata, basi contracta, supra nitidula, sicc. supra saturate et subtus dilute rubro-brunnea, supra glaberrima, subtus primum ubique pilis rufis densius puberulo-pubescent, deinde costa nervis venulis satis dense, ceterum sparse puberula, lepidota, raphidibus inconspicuis, nervis utroque latere costae 11–15, nervis venulisque subtus prominulis. Stipulae ambitu obovatae, 2.7 cm. longae et 2.2 cm. latae, bifidae, lobis late et oblique triangularibus 1.2 cm. longis, margine ciliatae, costa pilis rufis dense, ceterum sparsissime puberulo-pubescentes, sicc. saturate rubro-brunneae. Inflorescentiae pedunculo recurvato, puberulo, circ. 10 mm. longo instructae; ramuli 5 subumbellati, infimi semel dichasiales, omnes pilis rufis puberulo-hirtelli, primum circ. 1.1 cm., deinde usque ad 2 cm. longi. Bractae ramulorum triangulares, infimae 8 mm. longae, carinatae; bractae florales inaequales, cuiusque paris inferior 2–2.5 mm. longa, superior dimidio brevior. Florum pares stipite 2 mm. longo, hirtello instructi. Flores pedicellati. Pedicelli cuiusque paris paulum inaequales, 2.5 vel 3 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 3.5 mm. longa, tubo tereti. Fructus pilis rufis puberulo-hirtellus; pyrenae rubro-brunneae.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO. Southern and Eastern Division: Tidung, G. Labang, *Amdjah*, Exped. v. *Genderen Stort* 283 (BZ), TYPUS.

Streblosa maxima and *Str. myriocarpa* are very similar: both are provided with stout, densely pubescent shoots, large, on the upper side completely glabrous and on the underside, especially on the midrib and on the network of the nerves and venules, densely puberulous-pubescent leaves, large, slightly puberulous-pubescent stipules and many-flowered inflorescences with five main branchlets and pedicellate flowers. *Streblosa bracteata* is apparently a less robust plant provided with a less conspicuous indumentum, but with leaves and stipules of a similar shape and size. *Streblosa maxima* differs from *Str. myriocarpa* in the greater length of the petioles, the larger, caudate-acuminate leaves with their smaller number of nerves and more lax reticulation, the reddish brown colour of the indumentum, the inconspicuousness of the raphides, and the smaller size of the bracts at the base of the branchlets.

7. *Streblosa multiglandulosa* Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929.

Caulis circ. 30 cm. altus, primum pilis rubro-brunneis crispatulis dense

villosus, deinde glabrescens, usque ad 5 mm. diam. accrescens. Folia petiolo 1–1.5 cm. longo, dense crispatulo-villoso instructa; lamina oblongo-ovata vel oblongo-obovata, 9–14 cm. longa et 4–6 cm. lata, apice acuminata, basi cuneata, subcoriacea, supra sicc. olivacea, glabra, cellulis resiniferis rubris vel brunneis punctata, subtus praesertim costa nervisque pilis rubro-brunneis vel ferrugineis conspicue crispatulo-villosa, nervis utroque latere costae circ. 13, venulis subtus prominulis. Stipulae ambitu ovatae, bifidae, 1–1.4 cm. longae. Inflorescentiae subsessiles, multiflorae, densae; ramuli circ. 1 cm. longi. Bracteae florales lineari-lanceolatae, 8–12 mm. longae et 1–1.5 mm. latae, acuminatae, rubro-striatulae, pilis rubro-brunneis pubescentes. Flores pedicellati; pedicelli 1–4 mm. longi. Fructus rubro-striatulus, plus minusve ferrugineo-villosus.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO. British North Borneo, near Tawao, *Elmer 21909*, TYPUS, n.v.

The position of this species is difficult to determine. The presence of resin cells not only in the mesophyll of the bracts and in the mesocarp but also in the epidermis on the upper side of the leaves is a diagnostic character of great importance, but as these cells are found in such distantly related species as *Str. tortilis* and *Str. polyantha*, the taxonomic value of this character is small. Of more importance are the ovate stipules, the long floral bracts and the pedicellate flowers, for on account of these characters it is to be assigned a place between or next to the species 9–18, of which the first four occur, like *Str. multiglandulosa*, in Borneo and the remaining ones in the Anambas Islands and in Sumatra. The presence of curled hairs on the stem and on the underside of the leaves suggest a nearer affinity with the Bornean *Str. bullata* and *Str. bracteolata*. On account of this presumed affinity it has been assumed in the key that it belongs to the same group of Bornean species as the latter (species 8–11), and that its stipules are, like those of the other species of this group, provided with a prominent midrib. It differs from the species 8–11 in the presence of resin cells in the epidermis on the upper side of the leaves. In this respect it resembles the Sumatran *Str. polyantha*, from which it is easily distinguishable by the entirely glabrous upper side of the leaves. In the "rather rigid" leaves it resembles *Str. bracteolata*.

8. *Streblosa Johannis-Winkleri* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1927.

Caulis usque ad 60 cm. altus, erectus, ultimo tamen prostratus et ex axillis innovationes emittens, ad apicem 1.2 mm. diam. et pilis paucis sparsus, mox glabrescens tamen et basi usque ad 3 mm. diam. incrassatus, internodiis leviter bicostatis, primum vix conspicue complanatis sed haud sulcatis, basi lignescente cortice fusco et libero crassiore sed haud distincte striatulo vestitus. Folia petiolo subtus primum pilis rufis dense vestito, deinde glabrescente, 1.5–2.5 cm. longo instructa; lamina lanceolata, 12–14 cm. longa et 4.2–5 cm. lata, utroque extremo contracta, opaca, supra sicc. nigro-brunnea, subtus dilute brunnea, supra glabra, subtus ubique pilis rufis sparsa, lepidota, raphidibus minime in foliis novellis distinguendis, nervis utroque latere costae 8–10, venulis subtus prominulis. Stipulae ambitu ovatae, 10–15 mm. longae et 7–9 mm. latae, acuminatae, bifidae, lobis 5 mm. longis, contiguis, margine et costa prominente ciliatae, ceterum

glabrae. Inflorescentiae pedunculo recurvato, sparse hirtello, 4 mm. longo instructae; ramuli 5 subumbellati, simplices, primum circ. 0.5 cm., deinde usque ad 1 cm. longi, sparse hirtelli. Bracteae ramulorum lineari-lanceolatae, 7 mm. longae et 1.5 mm. latae, subglabrae; bracteae florales margine ciliatae, inaequales, cuiusque paris inferior linearis, 3–4.5 mm. longa et 0.3–0.4 mm. lata, superior lineari-lanceolata, 1.2 mm. longa et 0.3–0.4 mm. lata, 0.5 mm. in pedicellum egrediens. Florum pares stipite 0.5 mm. longo instructi. Flores pedicellati; pedicelli 2.5 mm. longi, parce hirtelli. Calyx 0.7 mm. altus, lobis ovato-triangularibus tubo subaequilongis. Corolla 3 mm. longa, tubo tereti. Fructus parce hirtellus; pyrenae rubrae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO: Western Division: Schwaner Mts., Bukit Mulu, alt. 450 m., *Winkler 441* (HBG, *TYPE*); Lebang Hara, alt. 150–180 m., *Winkler 352, 356* (HBG), n.v.

The stipules of this species are not only like those of *Str. maxima*, *Str. bullata* and *Str. bracteolata*, provided with a distinct midrib, but its internodes, moreover, are distinctly bicostate, the midribs of the stipules decurring to the preceding node, whereas the shoots of the other species are ecostate. Bicostate internodes, however, are a constant feature of the Bornean representatives of the subgenus *Para-streblosa*. Among the species belonging to the subgenus *Eu-streblosa*, to which *Str. Johannis-Winkleri*, on account of the ovate stipules, unequal floral bracts and the complete ring of hairs in the corolla-tube doubtless belongs, it comes nearest to *Str. undulata*, *Str. bullata* and *Str. bracteolata*, which it resembles in the shape and size of the stipules and in the nature of the indumentum. From *Str. bullata* and *Str. bracteolata* it differs conspicuously in the narrow leaves, and from *Str. undulata* in the smaller number of nerves; from all three moreover in the bicostate internodes.

9. *Streblosa undulata* Khs. interpr. Val. in Engl., Bot. Jahrb. 44: 568. 1910; an Khs. in Ned. Kruidk. Arch. II, 2: 247. 1851 = *Psychotria undulata* (Khs.) Miq., Fl. Ind. Bat. 2: 291. 1857 et Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1891, incertum.

Caulis 50 cm. altus, ad apicem fuliginoso-villosus, basin versus lignescens. Folia petiolata; lamina lanceolata, 9–15 cm. longa et 3.5–5 cm. lata, apice sensim acuminata vel attenuata, basi attenuata, margine saepe leviter undulata, supra glabra, sicc. fusca vel olivacea, subtus ubique sed imprimis ad nervos sparse fuliginoso-villosula, sicc. pallide olivacea, nervis utroque latere costae circ. 12, subtus prominulis et colore fusco conspicuis. Stipulae late ovato-lanceolatae, bifidae, lobis acuminatis villosulis, 12 mm. longae et basi 6 mm. latae. Inflorescentiae subsessiles, densiflorae. Bracteae florales lineares, floribus aequilongae, crassiusculae, pilosae. Flores pedicellati. Pedicelli floribus aequilongi, 2–4 mm. longi. Fructus hirtellus.

Habitat terrae Borneënsis partem austro-orientalem.

BORNEO: Southern and Eastern Division: Hayup, *H. Winkler 2583*, *typus descriptionis*, n.v.; between Batu Babi and Lumowia, *H. Winkler 2826, 2861*, n.v.

The description given above has been based on that of Valetton, but whether the specimens investigated by the latter really are conspecific

with those collected by Korthals on Mt. Sakumbang, seems dubious, for Korthals described the leaves as elliptic and hirsute on the nerves beneath, the stipules as ovate and the bracts as oblong, whereas the leaves of Winkler's specimens are, according to Valeton's description, lanceolate and sparsely villosulous on the nerves beneath, the stipules ovate-lanceolate and the bracts linear. It is quite possible that in the future, when the flora of the south-eastern part of Borneo becomes better known, a species may be found which fits Korthals' description better than that described by Valeton. In my opinion it would have been better if Valeton had described Winkler's specimens under a new name: in the absence of the type-specimen, Korthals' species doubtless can not be regarded as sufficiently recognizable. Provisionally, however, I have accepted Valeton's interpretation.

The species described above apparently comes near to *Str. Johannis-Winkleri*, from which it differs in a somewhat more conspicuous indumentum, a larger number of nerves in the leaves, narrower stipules, and probably also by the absence of the ribs on the internodes: the latter, at any rate, are not mentioned in Valeton's description.

10. *Streblosa bullata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 296. 1937.

Caulis ascendens, circ. 15 cm. altus, ad apicem 1.5 mm. diam., basi usque ad 2.5 mm. incrassatus, primum pilis rufis dense pubescens, deinde plus minusve glabrescens, internodiis haud distincte sulcatis, basi libero crassiore sed haud distincte striatulo vestitus; pars decumbens radicans. Folia petiolo subtus pilis rufis primum dense, deinde sparse pubescente, 0.5–1.5 cm. longo instructa; lamina elliptica, elliptico-oblonga vel elliptico-ovata, 4.5–7.5 cm. longa et 2.7–6.2 cm. lata, apice subobtusata vel obtusata, basi ad petiolum subito contracta, opaca, sicc. supra olivacea, ad costam nervos venulos tamen pallida, subtus dilute olivacea, costa nervisque brunneis, inter nervos et venulos conspicue bullata, supra glabra, subtus costa nervis venulis a pilis primum rubro-brunneis, deinde ferrugineis dense pubescens, lepidota, raphidibus inconspicuis, nervis utroque latere costae 8–10, venulis subtus prominulis. Stipulae ambitu ovatae, 7.5–8.5 mm. longae et 8–10 mm. latae, bilobae, lobis 2.5 mm. longis, contiguis, margine ciliatae, costa densius puberulo-pubescentes, ceterum glabrae. Inflorescentiae pedunculo recurvato, sparse pubescente, 5 mm. longo instructae; bis dichasiales, 2 cm. diam. Bracteae infimae lanceolatae, 12.5 mm. longae et 4.5 mm. latae, margine ciliatae; bracteae florales lineares, margine et costa ciliatae, inaequales, cuiusque paris inferior circ. 8 mm. longa et 2 mm. lata, superior circ. 5 mm. longa et 0.8 mm. lata, in pedicellum usque ad 0.5 mm. egrediens. Flores pedicellati; pedicelli sparse hirtelli, florum in furcis dichasiorum insertorum circ. 7 mm. longi, aliorum circ. 3 mm. longi; florum pares stipite 1 mm. longo elati. Calyx 1.4 mm. altus, lobis ovato-triangularibus tubo subaequilongis. Corolla 5.5 mm. longa, tubo tereti. Fructus sparse hirtellus; pyrenae luteolae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Upper Kapuas Mts., Nanga Era, alt. 150 m., *Winkler 1560* (HBG, TYPUS).

This species is easily distinguishable by its conspicuously bullate leaves.

Its most important character, however, is the twice dichasially branched inflorescence. In this respect it comes nearest to *Str. bracteolata*, for in both species the inflorescences are entirely cymous, whereas elsewhere the main axis bears a number of racemosely arranged branchlets. In the length of the bracts and in the comparatively large size of the flowers too, these two species resemble each other. In the nature of the stipules and in the hairiness of the nerves and venules on the underside of the leaves they resemble the other Bornean species of the subgenus *Eu-streblosa*.

11. *Streblosa bracteolata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 295. 1937.

Caulis ascendens, circ. 30 cm. altus, ad apicem 1.6 mm. diam., basi usque ad 3 mm. incrassatus, primum pilis fuscis dense pubescens, deinde plus minusve glabrescens, internodiis primum plus minusve complanatis sed vix sulcatis, basi libero crassiore, haud distincte striatulo vestitus; pars decumbens radicans. Folia petiolo subtus dense pubescente, 1–2 cm. longo instructa; lamina obovata vel elliptico-obovata, 6–9.5 cm. longa et 3.8–5 cm. lata, apice breviter acuminata, basi contracta, pro genere rigidior, opaca, sicc. supra olivacea, subtus dilute brunnea, supra glabra, subtus pilis fuscis ubique sed costa nervis venulis densius pubescens, lepidota, raphidibus inconspicuis, nervis utroque latere costae 8 vel 9, venulis subtus prominulis. Stipulae ambitu late ovatae, 9.5 mm. longae et 12 mm. latae, bilobae, lobis 2.5 mm. longis, margine ciliatae, costa pubescentes sed ceterum glabrae. Inflorescentiae pedunculo recurvato, pubescente, 3 mm. longo instructae; simplices. Bracteae florales infimae subaequales, lanceolatae, 12 mm. longae et 4 mm. latae, margine ciliatae; aliae lineares, extus sparse hirtellae, margine ciliatae, inaequales, cuiusque pars inferior 10 mm. longa et 1.7 mm. lata, superior 6 mm. longa et 0.9 mm. lata. Florum pares stipite 1 mm. longo elati. Flores pedicellati; pedicelli subglabri, circ. 3 mm. longi. Calyx 2 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 8 mm. longa, tubo tereti. Fructus sparse hirtellus; pyrenae rubro-brunneae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Schwaner Mts., Bukit Mulu, alt. 300 m., *Winkler 1198* (HBG, *TYPE*); Bidang Menabei, *Winkler 831* (HBG).

As stated above, this species comes nearest to *Str. bullata*, from which it is, however, easily distinguishable: its leaves are plane, the inflorescences unbranched, the bracts longer and the flowers larger. The relations of these two species with *Str. Johannis-Winkleri* and *Str. undulata* have been discussed already in the note at the end of the description of *Str. Johannis-Winkleri*.

Merrill, l.c., compares this species with *Str. pubescens* Ridl., of which I have seen no material, but whose position in the genus *Streblosa* seems to me very dubious. Its stipules are said to be lanceolate-acuminate, which would mean that they are entire, its stamens should be inserted at the base of the corolla-tube, and both the stamens and the style should be included. It is possible that my objections against its position are based on inaccuracies in the description, and that it is in reality a true *Streblosa*. On account of its sessile flowers, it is, at any rate, not probable that it would belong to the nearest allies of the species described above.

12. *Streblosa anambasica* Brem. n. spec.; TYPUS: *v. Steenis* 703 (L).

Caulis ascendens, circ. 40 cm. altus, ad apicem 1.5 mm. diam., basi usque ad 4 mm. incrassatus, primum pilis paucis sparsus, mox totus glabrescens, internodiis primum bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo marginibus primum parce ciliato, 1–3.5 cm. longo instructa; lamina lanceolata, 11–14 cm. longa et 4.2–4.8 cm. lata, apice acuta vel subacuminata, basi cuneata vel subcontracta, opaca, sicc. supra saturate et subtus dilute brunnea, utrimque glabra, subtus lepidota, raphidibus inconspicuis, nervis utroque latere costae 9 vel 10, venulis sicc. colore saturatiore subtus conspicuis sed vix prominulis. Stipulae ambitu ovatae, 7 mm. altae et 6 mm. latae, acutae, bifidae, lobis contiguis 3 mm. longis, ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, primum pilis rufis puberulo-pubescente, deinde glabrescente, circ. 5 mm. longo instructae; ramuli 5 subumbellati, primum pubescentes, deinde glabrescentes, primum circ. 7 mm., deinde usque ad 13 mm. longi, infimi semel dichasiales. Bractae ramulorum lineari-lanceolatae, primum subtus parce pubescentes, deinde glabrescentes, deciduae, infimae usque ad 9 mm. longae; bractae florales lineares, paulum inaequales, cuiusque paris inferior 4–5 mm., superior 3–3.5 mm. longa, praesertim margine plus minusve distincte hirtello-pubescentes. Florum pares stipite 1 mm. longo instructi. Flores pedicellati; pedicelli circ. 1.5 mm. longi, parce hirtello-pubescentes. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 1.5 mm. longa, tubo tereti. Fructus hirtellus; pyrenae luteolae.

Habitat Archipelagum Anambasicum.

ANAMBAS ISLANDS: Siantan: east of Terampa, alt. 200 m., *v. Steenis* 703 (L, TYPUS).

This species occupies a rather isolated position in the genus. By the shortness of the pedicels it resembles *Str. lampongensis*, from which it differs, however, conspicuously in the shape of the stipules and in the thinness of the secondary bast. In the shape of the stipules it resembles the Bornean species 8–11 and the Sumatran species 13–17, especially the latter, for from the Bornean species it differs by the inevidence of the midrib. The Sumatran species it resembles also in the thinness of the secondary bast, but it differs from them in the larger number of branchlets in the inflorescence.

Habitually *Str. anambasica* is easily distinguishable from the other species of the subgenus *Eu-streblosa* by its glabrous leaves. The only other species with entirely glabrous leaves is *Str. leiophylla*, a plant from the Mentawai Islands, which is provided with much smaller, more compact inflorescences with three simple branchlets, larger stipules with shorter lobes, and nitidulous, in dried material olivaceous leaves.

13. *Streblosa deliensis* Brem. n. spec.; TYPUS: *Loerzing* 4660 (L).

Caulis ascendens, circ. 30 cm. altus, ad apicem 1.8 mm. diam., basi usque ad 3.5 cm. incrassatus, glaber, parte novella sicc. nigrescente, internodiis primum bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo glabro, 2–5 cm. longo instructa; lamina lanceolato-oblonga vel lanceolato-elliptica, 12–15 cm. longa et

4–6.5 cm. lata, apice acuminata vel attenuata, basi cuneata vel contracta, opaca, sicc. supra saturate olivacea, subtus dilute olivaceo-brunnea, subtus costa nervisque primum puberulo-pubescent, mox ubique glabrescent, vix conspicue lepidota, raphidibus inconspicuis, nervis utroque latere costae 9–11, venulis subtus prominulis. Stipulae ambitu ovato-lanceolatae, 10 mm. altae et 7 mm. latae, acutae, bifidae, lobis contiguis 5 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, 3 mm. longo instructae; ramuli 3, simplices, 9–10 mm. longi, post anthesin vix elongati. Bractae ramulorum ovatae, 5 mm. longae et 3 mm. latae, ciliolatae; bractae florales lineares, inaequales, cuiusque paris inferior 5 mm. longa et 1 mm. lata, superior 2.5 mm. longa et 0.5 mm. lata. Florum pares stipite 1–1.5 mm. longo instructi. Flores pedicellati; pedicelli glabri, circ. 3 mm. longi. Calyx 0.7 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 1.9 mm. longa, tubo tereti. Fructus puberulus; pyrenae rubrae.

Habitat Sumatram Occidentalem.

SUMATRA. East Coast Govt.: Deli, Sibolangit, on the grounds of the Botanic Garden, alt. 450 m., *Loerzing* 4660 (L, TYPUS).

Streblosa deliensis, *Str. hypomalaca*, *Str. leiophylla*, *Str. polyantha* and *Str. scabridula* resemble each other in the thinness of the secondary bast in the basal part of the stem, the ecostate stipules, and the very shortly pedunculate inflorescences with their three simple branchlets, which do not markedly elongate when the fruits ripen. They are all five endemic in Sumatra and the neighbouring Mentawai Islands. *Streblosa deliensis* differs from the four others in the narrower, bifid, not bilobate, stipules and in the ovate shape of the bracts at the base of the inflorescence. It is a nearly glabrous plant, and in this respect it comes nearest to *Str. leiophylla*, whose leaves, however, are completely glabrous and nitidulous.

14. *Streblosa hypomalaca* Brem. n. spec.; TYPUS: *Ibut* 445 (L).

Streblosa hirta Ridl. in errore apud Ridl. in Kew Bull. 1926: 70. 1926, non Ridl. in Jour. As. Soc. Straits 57: 63. 1911.

Caulis usque ad 50 cm. altus, parte basali non visa, ad apicem 1.2 mm. diam., basin versus usque ad 4.5 mm. incrassatus, primum dense pubescens, deinde glabrescens, internodiis bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum dense, deinde sparse pubescente, 0.5–1.8 cm. longo instructa; lamina lanceolata, 8.5–13 cm. longa et 2.5–5 cm. lata, utroque extremo attenuata, supra nitidula, sicc. supra saturate, subtus dilute olivaceo-brunnea, costa canaliculata supra pilis paucis sparsa, subtus primum dense, deinde sparsius pubescente, haud lepidota, raphidibus inconspicuis, nervis utroque latere costae 10 vel 11, venulis subtus vix prominulis. Stipulae ambitu ovato-orbiculares, 3.7–4.7 mm. altae et 4–5 mm. latae, acutae, bilobae, lobis contiguis 1.2 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, puberulo-hirtello, 3 mm. longo instructae; ramuli 3, simplices, 9 mm. longi, post anthesin vix elongati, puberulo-hirtelli. Bractae ramulorum lineares, 7 mm. longae, apice puberulo-hirtellae; bractae florales etiam lineares, inaequales, cuiusque paris inferior 5 mm. longa et 1.3 mm. lata, superior 2.5 mm. longa et 0.7 mm. lata. Florum pares stipite 1 mm. longo instructi. Flores pedicellati; pedicelli apicem versus

sparse hirtelli, 2.3 mm. longi. Calyx 0.6 mm. altus, lobis ovatis tubo paulo longioribus. Corolla nondum aperta 1.8 mm. longa, tubo tereti. Fructus hirtellus; pyrenae rubrae.

Habitat insulam Siporam in Archipelago Mentaweiensi.

MENTAWEI ISLANDS. Sipora: near Sioban, *Ibut* 445 (L, TYPUS).

Ibut accompanied Boden Kloss on his visit to the Mentawai Islands as collector for the Botanical Gardens, Buitenzorg, and the types of this species and the next were collected on the same dates as the specimens quoted by Ridley, l.c., under the names *Str. hirta* and *Str. microcarpa*. It can therefore hardly be doubted that they are identical with the latter.

The stipules of *Str. hypomalaca* are of the same shape as those of *Str. leiophylla*, *Str. polyantha* and *Str. scabridula*, but they are much smaller. A remarkable feature of this species is the comparatively short petioles: in this respect it resembles the Bornean *Str. bullata* and *Str. bracteolata*.

15. *Streblosa leiophylla* Brem. n. spec.; TYPUS: *Ibut* 98 (L).

Streblosa microcarpa Ridl. in errore apud Ridl. in Kew Bull. 1926: 70. 1926, non Ridl., Fl. Mal. Pen. 2: 148. 1923.

Caulis ascendens, circ. 40 cm. altus, ad apicem 1.6 mm. diam., basi usque ad 5 mm. incrassatus, glaber, parte novella sicc. fuscescente, internodiis primum complanatis sed haud distincte sulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo glabro, 1–3.5 cm. longo instructa; lamina elliptico-oblonga, 9–15 cm. longa et 5.5–7.5 cm. lata, apice acuta vel subacuminata, basi contracta, supra nitidula, sicc. supra saturate et subtus dilute olivaceo-brunnea, utrimque glaberrima, subtus haud lepidota, raphidibus inconspicuis, nervis utroque latere costae 12 vel 13, venulis subtus prominulis. Stipulae ambitu ovato-orbiculares, 11 mm. altae et 10 mm. latae, acutae, bilobae, lobis contiguis 3 mm. longis, margine fugaciter ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, subglabro, 4 mm. longo instructae; ramuli 3 simplices, circ. 9 mm. longi, post anthesin vix elongati. Bractae ramulorum lineari-lanceolatae, 6.5 mm. longae, subglabrae; bractae florales lineares, extus dimidio superiore puberulae, inaequales, cuiusque paris inferior 4.5–5 mm. longa, superior 3–3.5 mm. longa. Florum pares stipite 1 mm. longo instructi. Flores pedicellati; pedicelli sparse hirtelli, 1.5 mm. longi. Calyx 0.8 mm. longus, lobis ovatis tubo paulo longioribus. Corolla matura nondum visa. Fructus apice puberulo-hirtellus; pyrenae luteolae.

Habitat insulam Archipelagi Mentaweiensis Siberut dictam.

MENTAWEI ISLANDS. Siberut: near the village of the same name, *Ibut* 98 (L, TYPUS).

This species is easily recognizable by the completely glabrous stem and leaves. In the size of the stipules it resembles *Str. polyantha* and *Str. scabridula*, but in other respects it is more like *Str. hypomalaca*, the other species from the Mentawai Islands; its leaves are like those of the latter, on the underside smooth, not lepidote as in *Str. polyantha* and *Str. scabridula*, i.e. they lack the pallid protuberances by which in the latter the stomata are raised above the general level of the epidermis, and the flower-pairs are provided with a stipe of the same length as that of *Str.*

hypomalaca, and longer than that found in *Str. polyantha* and in *Str. scabridula*.

16. *Streblosa polyantha* Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851; Miq. in Ann. Mus. Bot. Lugd.-Bat. 4: 262. 1869.

Psychotria singalensis Miq., Fl. Ind. Bat. 2: 294. 1858, n. nom., Suppl. 223. 1860; Boerl., Handl. Fl. Ned. Ind. 2 (1): 139. 1891.

Streblosa hirta Ridl. in Jour. As. Soc. Straits 57: 63. 1911, cuius folia angustiora videntur, adhuc incertum sed haud improbabile.

Caulis probabiliter circ. 25 cm. alta, sed parte basali in speciminibus investigatis non conservata, ad apicem 1.5 mm. diam., basin versus usque ad 3 mm. incrassatus, primum dense villosus, ultimo plus minusve glabrescens, internodiis primum bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum dense, deinde minus dense villosa, 1–3 cm. longo instructa; lamina elliptica vel oblongo-elliptica, 9–12 cm. longa et 4.5–5.7 cm. lata, apice acuta vel acuminata, basi contracta, opaca, sicc. supra olivacea et cellulis resiniferis nigropunctata, utrimque sparse villosa, costa nervisque subtus tamen densius villosa, subtus lepidota, raphidibus supra ad costam distinguendis, ceterum inconspicuis, nervis utroque latere costae 9 vel 10, venulis subtus vix prominulis. Stipulae ambitu ovato-orbiculares, 12 mm. altae lataeque, acutae, breviter bilobae, lobis contiguis 3 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, circ. 3 mm. longo instructae; ramuli 3 simplices, circ. 9 mm. longi, post anthesin vix elongati. Bractae omnes lineares, margine ciliatae, ramulorum 5 mm. longae, florales inaequales, cuiusque paris inferior 3.5 mm., superior 2.5 mm. longa. Florum pares stipite 0.5 mm. longo elati. Flores pedicellati; pedicelli glabri, circ. 1.5 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 1.5 mm. longa, tubo tereti. Fructus ad apicem hirtellus; pyrenae nigrae.

Habitat Sumatram Occidentalem et forsitan Peninsulam Malayanam.

SUMATRA. West Coast Res.: G. Malintang, *Korthals s.n.* (L, U, TYP1).

MALAY PENINSULA. Penang et Perak (*Str. hirta* Ridl.) n.v.

The leaves of *Str. hirta* Ridl. have been described as slightly narrower than those of *Str. polyantha* (10–15 cm. \times 3.7–5 cm. instead of 9–12 cm. \times 4.5–5.7 cm.), but as the description reveals no other points of difference, I am, for the moment, unwilling to accept it as specifically distinct. Ridley had seen no material of Korthals' species, and the existing descriptions were too incomplete to be of much use. It is, of course, not impossible that a renewed investigation will reveal the presence of more important differences.

Streblosa polyantha resembles the next species in many respects, but is easily distinguishable by the softness of the indumentum, by the somewhat broader leaves, which are provided with a smaller number of nerves and with resin cells in the epidermis of the upper side, and further, by the black pyrenes.

17. *Streblosa scabridula* Brem. n. spec.; TYPUS: *Docters v. Leeuwen 3194* (L).

Caulis ascendens, circ. 40 cm. altus, ad apicem 1.5 mm. diam., basi usque ad 5.5 mm. incrassatus, primum dense, deinde sparse hirsutus,

internodiis primum vix distincte bisulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum dense, deinde sparsius hirsuto, 1–3 cm. longo instructa; lamina lanceolato-oblonga, 9–14.5 cm. longa et 3–5 cm. lata, apice acuminata, basi contracta, supra nitidula, sicc. supra saturate et subtus dilute olivaceo-brunnea, utrimque sed praesertim subtus costa nervisque scabrido-hirsuta, subtus vix distincte lepidota, raphidibus inconspicuis, nervis utroque latere costae 12 vel 13, venulis subtus prominulis. Stipulae ambitu ovato-orbiculares, 17 mm. altae et 13 mm. latae, acutae, bilobae, lobis contiguus 4 mm. longis, margine ciliatae, ceterum glabrae. Inflorescentiae pedunculo recurvato, 4 mm. longo instructae; ramuli 3 simplices, circ. 9 mm. longi, post anthesin vix elongati. Bractae omnes lineares, margine dense ciliatae; florales inaequales, cuiusque paris inferior 4 mm., superior 3 mm. longa. Florum pares stipite 0.5 mm. longo instructi. Flores pedicellati; pedicelli sparse hirtelli, circ. 2 mm. longi. Calyx 0.8 mm. altus, lobis ovato-triangularibus tubo aequilongis. Corolla 3 mm. longa, tubo tereti. Fructus apice hirtellus; pyrenae rubrae.

Habitat Sumatram Orientalem.

SUMATRA. East Coast Govt.: Asahan, Haboko, *Docters v. Leeuwen 3194* (L, TYPUS).

The differences between this species and the nearly related *Str. polyantha* have already been discussed. From the other species belonging to this genus they differ in the presence of fairly long hairs on the upper side of the leaves.

Subgenus *Para-streblosa*.

Folia subtus numquam lepidota. Stipulae parvae, parte basali indivisa brevi. Bractae cuiusque paris suboppositae et subaequales. Flores semper subsessiles. Corollae tubus teres, intus fasciculis 5 pilorum instructus. Fructus nunc didymus, nunc globosus. — Species 18–25, in terra Borneënsi et insulis Philippinis endemicae.

Series *Costatae*.

Stipulae costa prominente et usque ad nodum praecedentem decurrente instructae; lobi stipulares contigui. — Species 18–23, omnes Borneënses.

18. *Streblosa chlamydantha* Brem. n. spec.; TYPUS: *Endert 2414* (BZ).

Caulis ascendens, circ. 1 m. altus, interdum pseudo-dichotome furcatus, ad apicem 2 mm. diam., basi usque ad 9 mm. incrassatus, primum puberulus, internodiis primum bisulcatis, sulcis tamen mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, deinde glabrescente, 0.8–6 cm. longo instructa; lamina oblanceolata vel elliptica, foliorum supremorum 12–13 cm. longa et 5.5–6.5 cm. lata, inferiorum usque ad 19 cm. longa et 9 cm. lata, omnium apice caudato-acuminata, basi contracta, opaca, sicc. supra saturate brunnea, subtus dilute olivaceo-brunnea, supra glabra, subtus primum costa nervis venulis dense puberula, ultimo plus minusve glabrescens, subtus raphidibus dense lineolata, nervis utroque latere costae plerumque 14–15, venulis subtus vix prominulis. Stipulae fugaces, parte indivisa 1 mm. alta, lobis e basi triangulari filiformibus, 3–4 mm. longis. Inflorescentiae pedunculo recurvato, usque ad 5 mm. longo instructae; ramuli 5, subumbellati, pri-

mum circ. 7 mm. longi et toti bracteis imbricatis obtecti, deinde bracteis exutis usque ad 3.5 cm. elongati, puberulo-pubescentes. Bracteae ramulorum oblanceolatae; bracteae florales obovatae, 3.7 mm. longae et 2.8 mm. latae, margine vix conspicue ciliolatae, ceterum glabrae, raphidibus conspicue lineolatae. Florum pares estipitati. Calyx subglaber, circ. 1.2 mm. altus, fere usque ad basin in lobos ovato-oblongos, imbricatos, distincte inaequales, margine vix conspicue ciliolatos partitus. Corolla 2 mm. longa. Fructus didymus, puberulus; pyrenae luteo-brunneae.

Habitat terrae Borneënsis partem centro-orientalem.

BORNEO. Southern and Eastern Division: West Kutai, near B. Puhus, alt. 70 m., *Endert 2414* (BZ, TYPUS).

Streblosa chlamydantha and *Str. longiscapa*, both inhabitants of the central part of East Borneo, are the tallest plants of this genus, for both reach a height of about one meter. They are, moreover, not rarely pseudo-dichotomously branched, but this peculiarity has also been observed in *Str. lampongensis*. From the other species of *Para-streblosa* they differ conspicuously in the didymous fruits. *Streblosa chlamydantha*, moreover, is easily recognizable by the large size of the bracts and by the large, distinctly unequal, imbricate calyx-lobes.

19. *Streblosa longiscapa* Brem. n. spec.; TYPUS: *Endert 3479* (BZ).

Caulis circ. 1 m. altus, interdum pseudo-dichotome furcatus, parte basali in speciminibus investigatis non conservata, ad apicem 2 mm. diam., basin versus usque ad 5 mm. incrassatus, glaber, internodiis primum bisulcatis, sulcis tamen mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, mox glabrescente, 0.8–4 cm. longo instructa; lamina lanceolata, rhomboidea vel elliptica, foliorum superiorum 6 cm. longa et 2.5 cm. lata, inferiorum usque ad 19 cm. longa et 9.5 cm. lata, omnium apice caudato-acuminata, basi contracta, opaca, sicc. supra saturate brunnea, subtus dilute olivaceo-brunnea, supra glabra, subtus primum costa nervis venulis dense puberula, ultimo plus minusve glabrescens, subtus raphidibus dense lineolata, nervis utroque latere costae in foliis supremis 8, in foliis aliis usque ad 17, venulis subtus vix conspicuis. Stipulae fugaces, parte indivisa circ. 2 mm. alta, lobis e basi triangulari filiformibus 4–6 mm. longis. Inflorescentiae pedunculo erecto, folio praecedenti subaequilongo vel eo paulo brevior, bicostato, glabrescente instructae; ramuli 9 paniculatim dispositi, semel dichasiales, puberulo-pubescentes; laterales centrali multo longiores. Bracteae ramulorum anguste triangulares, 2–3 mm. longae; bracteae florales lineares, 1.3–1.5 mm. longae, puberulo-pubescentes. Florum pares stipite 0.4 mm. longo instructi. Calyx puberulo-pubescent, 0.6 mm. altus, fere usque ad basin in lobos ovatos subobtusos partitus. Corolla matura nondum visa. Fructus didymus, subglaber; pyrenae luteolae.

Habitat terrae Borneënsis partem centro-orientalem.

BORNEO. Southern and Eastern Division: West Kutai, along the river Kiai, alt. 700 m., *Endert 4562* (BZ); H. Petak, alt. 500 m., *Endert 3479* (BZ, TYPUS).

This species is easily distinguishable by its long-pedunculate, paniculate inflorescences. As stated above, it is doubtless closely related to *Str. chlamydantha*.

20. *Streblosa lanceolata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1937.

Caulis ascendens, circ. 50 cm. altus, ad apicem 1.2 mm. diam., basi usque ad 3 mm. incrassatus, glaber, internodiis primum bisulcatis sed sulcis mox expletis, basi lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, mox glabrescente, 0.7–1.5 cm. longo instructa; lamina anguste lanceolata, 10–16 cm. longa et 2.0–3.3 cm. lata, apice caudato-attenuata, basi cuneata, opaca, sicc. supra saturate olivacea, subtus griseo-viridis, primum utrimque puberula, mox glabrescens, subtus raphidibus dense lineolata, nervis utroque latere costae 9 vel 10, venulis paucis vix conspicuis. Stipulae fugaces, parte indivisa 1 mm. alta, lobis e basi triangulari filiformibus 2 mm. longis. Inflorescentiae pedunculo patente, subglabro, usque ad 4 mm. longo instructae; ramuli plerumque 5 subumbellati, primum circ. 5 mm., deinde usque ad 15 mm. longi, infimi semel dichasiales, subglabri. Bractee omnes triangulares, puberulae, circ. 1 mm. longae; bractee florales quam ramulorum paulo latiores tamen, margine vix conspicue ciliolatae, deciduae. Calyx puberulus, 0.7 mm. longus, lobis ovato-triangularibus tubo subaequilongis. Corolla nondum nota. Fructus globosus, glaber; pyrenae luteolae.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Upper Kapuas Mts., Bukit Obat, alt. 90 m., Winkler 1392 (HBG, TYPUS); ibidem, Liang Gagang, Hallier 2391 (L).

Streblosa lanceolata, *Str. urticina*, *Str. glabra* and *Str. assimilis* resemble each other in the globose fruits, the short calyx-lobes and the shortly pedunculate inflorescences. *Streblosa lanceolata* and *Str. urticina* resemble each other also in other respects, for instance in the shape and size of the leaves and in the conspicuousness of the raphides on the underside, and also in the early deciduous bracts. The leaves of *Str. lanceolata*, however, are slightly narrower and shorter petiolate. The peduncles of this species too, are distinctly shorter. The leaves of *Str. glabra* and *Str. assimilis* are much wider, and the raphides are invisible; their bracts persist for a longer period.

21. *Streblosa urticina* Stapf in Trans. Linn. Soc. Bot. II. 4: 182, t. 13A, f. 1–10. 1894; Ridl. in Jour. As. Soc. Straits 57: 64. 1911, speciminibus in Sarawak lectis probabiliter exclusis (cf. *Str. assimilis* Brem.).

Caulis ascendens, probabiliter circ. 50 cm. altus, ad apicem 1.2 mm. diam., basi usque ad 3.5 mm. incrassatus, internodiis primum bisulcatis sed sulcis mox expletis, basi lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo 0.7–3 cm. longo instructa; lamina lanceolata vel oblongo-lanceolata, 11–16 cm. longa et 4–6 cm. lata, apice caudato-acuminata, basi contracta, opaca, sicc. supra saturate, subtus dilute olivacea, subtus raphidibus lineolata, nervis utroque latere costae 10–12, venulis subtus vix conspicuis. Stipulae e parte indivisa, 0.8 mm. alta, subpersistente et lobis e basi triangulari filiformibus, fugacibus compositae. Inflorescentiae pedunculo patente, 1.2–1.5 cm. longo instructae; ramuli plerumque 3, simplices vel semel dichasiales, primum 5–10 mm. longi, postea usque ad 25 mm. accrescentes. Bractee omnes triangulares, 0.6 mm. longae, mox deciduae. Calyx 0.4 mm. altus, lobis rotundatis tubo aequilongis. Corolla matura nondum nota. Fructus globosus; pyrenae rubro-brunneae.

Habitat terrae Borneënsis partem septentrionalem.

Species haec solvenda est in varietates duas; forma typica a me vocatur:

Streblosa urticina Stapf var. *Stapfii* Brem. n. nom.

Caulis primum puberulus, deinde glabrescens. Folia petiolo primum dense, deinde sparsius puberulo instructa; lamina primum utrimque sed praesertim subtus costa nervisque puberula, deinde plus minusve glabrescens, raphidibus supra inconspicuis. Inflorescentiae dense puberulae. Fructus puberulo-hirtellus.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO: British North Borneo: Mt. Kinabalu, Penokok, alt. 1000 m., *Haviland* 1328 (K, TYPUS), n.v.; Penibukan, ridge east of Dahobang Ridge, alt. 1200–1500 m., *J. & M. S. Clemens* 30698 (L); Penataran River, alt. 1000 m., *J. & M. S. Clemens* 34029 (L).

The habit was described by Stapf as climbing, but it was pointed out already by Ridley l.c. that this is a mistake. The flowers are according to Stapf 4-merous, but as the plate accompanying his description clearly shows, they are in reality, as elsewhere in this genus, 5-merous.

Streblosa urticina Stapf var. *glabrescens* Brem. n. var.; TYPUS var.: *Amdjah*, Exped. v. *Genderen Stort*, 371 (BZ).

Caulis glaberrimus. Folia mox tota glabrescentia, raphidibus utrimque lineolata. Inflorescentiae pedunculo glabro instructae, ceterum parce puberulae. Fructus subglaber.

Habitat terrae Borneënsis partem septentrionalem.

BORNEO. Southern and Eastern Division: Tidung, G. Labang, *Amdjah* (Exped. v. *Genderen Stort*) 371 (BZ, TYPUS varietatis).

The G. Labang, where this specimen was collected, lies near the British-North-Bornean frontier.

Streblosa urticina and *Str. lanceolata* are doubtless closely related. As stated above, the leaves of *Str. urticina* are slightly wider and longer petiolate, and the peduncles are much longer. *Streblosa urticina*, moreover, appears to be a plant occurring at a higher altitude: the specimens of the var. *Stapfii* at least were all collected between 1000 and 1500 m., whereas *Str. lanceolata* was found at a height of 90 m. *Streblosa urticina*, *Str. microcarpa* and *Str. axilliflora* are the only species found above 1000 m. altitude, but the two latter have also been collected in localities less high.

22. *Streblosa glabra* Val. in Engl., Bot. Jahrb. 44: 567. 1910; non Elm., Leaf. Philipp. Bot. 4: 1356. 1912, quae est *Str. palawanensis* Brem.; nec Merr., Enum. Philipp. Fl. Pl. 3: 564. 1921, quae est p.p. *Str. axilliflora* Merr. et p.p. *Str. palawanensis* Brem.

Streblosa platyphylla Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929.

Caulis ascendens, circ. 30 cm. altus, ad apicem circ. 2 mm. diam., basi usque ad 3 mm. incrassatus, primum vix conspicue puberulus, mox glabrescens, internodiis primum bisulcatis sed sulcis mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum puberulo, deinde plus minusve glabrescente, 1.2–5 cm. longo instructa; lamina elliptica, 14–17 cm. longa et 8–10 cm. lata, apice breviter caudato-acuminata, basi contracta, opaca, sicc. supra saturate,

subtus dilute olivaceo-brunnea, primum utrimque sed praesertim subtus costa nervisque puberula, deinde glabrescens, raphidibus inconspicuis, nervis utroque latere costae circ. 10, venulis subtus vix prominulis. Stipulae subpersistentes, parte indivisa 2 mm. alta, lobis e basi triangulari filiformibus, 2.5 mm. longis, costa decurrente pro serie debili. Inflorescentiae pedunculo patente, primum dense, deinde sparse puberulo, 7–12 mm. longo instructae; ramuli plerumque 3, simplices vel semel dichasiales, subumbellati, dense puberuli, 5–10 mm. longi, post anthesin vix accrescentes. Bractae omnes 2 mm. longae et sparse puberulae, ramulorum lineares, florales oblongae. Calyx puberulus, 0.4 mm. longus, lobis rotundatis tubo subaequilongis. Corolla 3.2 mm. longa, tubo tereti. Fructus globosus, puberulo-hirtellus; pyrenae luteolae.

Habitat terrae Borneënsis partem occidentalem.

BORNEO: Southern and Eastern Division: between Kondim Baru and Batu Babi, *H. Winkler* 2751 (L, dupl. TYPI). BRITISH NORTH BORNEO: Elphinstone Prov., Tawao, *Elmer* 21140 (U, AA, exempla typi *Str. platyphylla* Merr.).

The name of this species is somewhat misleading, for it is by no means completely glabrous. It may have influenced Merrill when he investigated the plants collected by Elmer at Tawao. Merrill described the leaves of the latter as "praesertim ad costam nervosque plus minusve sordide villosis," and a detached leaf added to one of the specimens in the herbarium of the Arnold Arboretum, indeed answers this description, but this leaf, which differs from the others not only in the nature of the indumentum but also in the colour it assumed in the press, and in the conspicuousness of the raphides, is either teratological or, more probably, part of another species. It is possible that the type-specimen consists of stems provided with this kind of leaves, but in view of the fact that the rest of the description agrees with that given above, this seems less probable than the supposition that the type too consists of leaves of both kinds. Acting on this supposition, I have reduced *Str. platyphylla* to *Str. glabra*. Whether the aberrant leaf belongs to a *Streblosa* species, is, of course, difficult to decide, but in view of the great similarity in the nervation, this does not look improbable to me.

Streblosa glabra differs from the two preceding species in the greater width of the leaves and in the inconspicuousness of the raphides, and also in the subpersistent stipules and bracts. From the next species it differs in the smaller size of the leaves, which, moreover, are provided with a smaller number of nerves, and in the smaller size of the flowers. The internodes of *Str. glabra* are less distinctly bicostate than those of the other species belonging to this series, but the ribs are nevertheless plainly visible.

23. *Streblosa assimilis* Brem. n. spec.; TYPUS: *Hallier* 2725 (L).

Streblosa urticina Stapf apud Ridl. in Jour. As. Soc. Straits 57: 64. 1911, quoad specimina in Sarawak lecta, adhuc incertum.

Caulis probabiliter ascendens, sed parte basali in speciminibus investigatis non conservata, ad apicem 2 mm. diam., basin versus usque ad 7 mm. incrassatus, glaber, internodiis primum bisulcatis sed sulcis mox expletis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia

petiolo glabro, 1.5–8 cm. longo instructa; lamina elliptica, 17–27 cm. longa et 8.5–12 cm. lata, apice breviter caudato-acuminata, basi acuta vel rotundata sed prope petiolum semper contracta, opaca, sicc. supra saturate et subtus dilute olivaceo-brunnea, primum vix conspicue puberula, mox glaberrima, raphidibus inconspicuis, nervis utroque latere costae circ. 13, venulis subtus vix prominulis. Stipulae subpersistentes, parte indivisa 2 mm. alta, lobis e basi triangulari filiformibus. Inflorescentiae pedunculo patente, parce puberulo, 4 mm. longo instructae; ramuli 3 vel 5, subumbellati, simplices vel semel dichasiales, primum 5–7 mm. longi, post anthesin paulum elongati. Bractae omnes ovatae, 2 mm. longae, subglabrae. Calyx puberulus, 0.6 mm. altus, lobis rotundatis tubo aequilongis. Corolla 6 mm. longa, tubo tereti. Fructus globosus, subglaber, maturus nondum notus.

Habitat terrae Borneënsis partem austro-occidentalem.

BORNEO. Western Division: Upper Kapuas Mts., Liang Gagang, *Hallier* 2725 (L, *TYPE*); ibidem, *Hallier* 2584 (L).

Very similar to the preceding species and by *Valetton* regarded as a mere variety of the latter (*Str. glabra* Val. var. *brevipes* Val. in sched.), but differing in several points: the stem is glabrous, more strongly bicostate and more robust, the leaves are larger, provided with a larger number of nerves and almost completely glabrous, the peduncle is shorter and the flowers are nearly twice as large.

It is not impossible that *Ridley* 12430 from Puak and 12432 from Lundu in Sarawak, which *Ridley* referred to *Str. urticina*, but of which he says: "They are more robust with larger leaves, the stems quite woody and erect," may prove to belong to the species described above.

Series *Ecostatae*.

Stipulae et internodia *ecostatae*; lobi stipulares sinu latiore separati. — Species 24–25, in Palawan et insulis Philippinis endemicae.

24. *Streblosa palawanensis* Brem. n. spec.; *TYPE*: *Merrill* 11586 (L).

Caulis suberectus, circ. 40 cm. altus, ad apicem circ. 1.5 mm. diam., basi usque ad 4 mm. incrassatus, internodiis haud sulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo primum subtus fusco-puberulo, mox glabrescente, 1–5 cm. longo instructa; lamina elliptico-lanceolata, 9.5–17 cm. longa et 3.8–6.2 cm. lata, apice caudato-acuminata, basi contracta, primum subtus costa nervisque plus minusve puberula, nervis utroque latere costae 9–12, venulis subtus vix prominulis. Stipulae fugaces, parte indivisa 0.5–1 mm. alta, lobis linearibus, 1.5–1.8 mm. longis, sinu rectangulari 1.5 mm. lato separatis. Inflorescentiae pedunculo patente, fusco-puberulo, 5–9 mm. longo instructae; ramuli plerumque 3, semel dichasiales, subumbellati, fusco-puberuli, primum 0.5–1 cm. longi, deinde usque ad 2.5 cm. elongati. Bractae omnes triangulares, fusco-puberulae, ramulorum usque ad 2 mm., florales 1–1.5 mm. longae. Calyx fusco-puberulus, 0.5 mm. altus, lobis late triangularibus tubo paulo longioribus. Corolla nondum matura 3.5 mm. longa, tubo tereti. Fructus globosus; pyrenae luteolae.

Habitat insulam Palawan dictam.

Species haec in varietates duas solvenda; forma typica a me vocatur:

Streblosa palawanensis Brem. var. *Merrillii* Brem. n. nom.

Lamina foliorum nitidula, sicc. utrimque olivacea, subtus raphidibus lineolata. Fructus vix conspicue hirtello-puberulus.

Habitat insulam Palawan dictam.

PALAWAN: Malampayan Bay, *Merrill 11586* (L, TYPUS, AA, dupl. typi).

Streblosa palawanensis Brem. var. *Elmeri* Brem. n. var.; TYPUS var.: *Elmer 12885* (L).

Streblosa glabra Val. in errore apud Elmer, *Leaf. Philipp. Bot.* 4: 1356. 1912; et apud Merr. *Enum. Philipp. Fl. Pl.* 3: 564. 1923, quoad specimen in Palawan lectum.

Lamina foliorum opaca, sicc. utrimque brunnea, raphidibus inconspicuis. Fructus conspicue hirtellus.

Habitat insulam Palawan dictam.

PALAWAN: Puerta Princesa, Mt. Pulgar, trail to Napsan, alt. 750 m., *Elmer 12285* (L, TYPUS var., AA, dupl.).

Elmer, l.c., describes the leaves of this plant as nitidulous, but in dried condition they are dull. A few inaccuracies of his description have already been pointed out in the introduction to this paper.

Streblosa palawanensis resembles *Str. axilliflora* in the ecostate internodes and in the wide gap between the two stipular lobes, but differs from that species in the absence of grooves in the young internodes, in the size and shape of the stipular lobes and in the shape of the gap by which the latter are separated from each other, and also in the somewhat larger size of the flowers.

25. *Streblosa axilliflora* Merr. in *Philipp. Jour. Sci. Bot.* 10: 144. 1915.

Streblosa glabra Val. in errore apud Merr., *Enum. Philipp. Fl. Pl.* 3: 564. 1923, quoad specimina in Luzon et Catanduanes lecta.

Caulis ascendens, plerumque 15–30 cm. altus, ad apicem circ. 1.5 mm. diam., basi usque ad 3 mm. incrassatus, internodiis haud profunde sed latius sulcatis, basin versus lignescens et ibi libero tenui, haud striatulo vestitus. Folia petiolo glabro vel primum fusco-puberulo, 1.5–5 cm. longo instructa; lamina nunc elliptico-lanceolata, 10–14 cm. longa et 4.2–5.4 cm. lata, nunc elliptica, circ. 8 cm. longa et 5.5 cm. lata, apice acuta vel vix conspicue acuminata, basi contracta, opaca vel nitidula, sicc. supra saturate et subtus dilute olivacea, primum subtus costa nervisque fusco-puberula, deinde plus minusve glabrescens, raphidibus subtus interdum distinguendis, nervis utroque latere costae 9 vel 10, venulis subtus vix prominulis. Stipulae fugaces, parte indivisa 1.5 mm. alta, lobis e basi circ. 3 mm. lata sensim attenuatis, 6–7 mm. longis, sinu 1–1.5 mm. lato, basi rotundato separatis. Inflorescentiae pedunculo patente, fusco-puberulo, circ. 3 mm. longo instructae; ramuli plerumque 3, semel dichasiales, subumbellati, fusco-puberuli. Bractae ramulorum triangulares, 3–4 mm. longae; bractae florales multo minores, plerumque circ. 1 mm. longae, margine parce ciliolatae. Calyx fusco-puberulus, 0.6 mm. altus, lobis triangularibus tubo paulo longioribus. Corolla circ. 2 mm. longa. Fructus globosus, hirtello-puberulus; pyrenae luteolae.

Habitat partem insulae Luzoniae australem et insulam Catanduanes dictam.

Species haec in varietates probabiliter plures solvenda est quarum tres ibi descriptae sunt; forma typica a me vocatur:

Streblosa axilliflora Merr. var. *angustifolia* Brem. n. nom.

Caulis glaber vel primum fusco-puberulus. Lamina foliorum elliptico-lanceolata, 10–14 cm. longa et 4.2–5.4 cm. lata. Ramuli inflorescentiarum post anthesin vix elongati, circ. 8 mm. longi.

Habitat partem Insulae Luzoniae australem.

LUZON. Camarines Sur: Panagan River, alt. 700 m., *Edaño* [B. Sc.] 76348 (NY); Kamugong River, alt. 400 m., *Edaño* [B. Sc.] 75901 (NY); Sorsogon: Irosin, Mt. Bulusan, *Elmer* 14605 (L, U, NY); s.l. *Ramos* [B. Sc.] 23560 (NY).

Streblosa axilliflora Merr. var. *latifolia* Brem. n. var.; TYPUS var.: *Ramos* & *Edaño* [B. Sc.] 45421 (NY).

Caulis densius puberulus. Lamina foliorum elliptica, circ. 8 cm. longa et 5.5 cm. lata. Ramuli inflorescentiarum post anthesin vix elongati, circ. 8 mm. longi.

Habitat partem Insulae Luzoniae australem.

LUZON. Tayabas: Casiguran, *Ramos* & *Edaño* [B. Sc.] 45421 (NY, TYPUS var., AA, dupl.).

Streblosa axilliflora Merr. var. *laxiflora* Brem. n. var.; TYPUS var.: *Ramos* & *Edaño* [B. Sc.] 75308 (NY).

Caulis glaber. Lamina foliorum elliptico-lanceolata, circ. 12 cm. longa et 5 cm. lata. Ramuli inflorescentiarum post anthesin usque ad 1.8 cm. elongati.

Habitat insulam Catanduanes dictam.

CATANDUANES: Mt. Abucay, alt. 1400 m., *Ramos* & *Edaño* [B. Sc.] 75308 (NY, typus var.); ibid., alt. 600 m., *Ramos* & *Edaño* [B. Sc.] 75466 (NY); Bato trail to Viga, alt. 250 m., *Ramos* & *Edaño* 75557 (NY).

It is not impossible that this variety, when more material becomes available, will prove to be sufficiently distinct to be raised to specific rank.

Merrill, l.c., quotes specimens collected in Samar, but as I did not see them, I am unable to express an opinion with regard to their taxonomic position.

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12. *anambasica* Brem. n. spec. — Anambas Islands.
23. *assimilis* Brem. n. spec. — West Borneo.
25. *axilliflora* Merr. in Philipp. Jour. Sci., Bot. 10: 141. 1915 — Philippines.
var. *angustifolia* Brem. n. nom. — Luzon.
var. *latifolia* Brem. n. var. — Luzon.
var. *laxiflora* Brem. n. var. — Catanduanes.
4. *bracteata* Ridl. in Jour. As. Soc. Straits 57: 64. 1911 — West Borneo.
11. *bracteolata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 295. 1937 — West Borneo.
10. *bullata* Merr. op. cit. 296 — West Borneo.
18. *chlamydantha* Brem. n. spec. — East Borneo.
13. *deliensis* Brem. n. spec. — East Sumatra.
22. *glabra* Val. in Bot. Jahrb. 44: 567. 1910 — East Borneo.
hirta Ridl. in Jour. As. Soc. Straits 57: 63. 1911, forsitan = *polyantha*, n.v.
14. *hypomalaca* Brem. n. spec. — Mentawai Islands.

8. *Johannis-Winkleri* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1937. — West Borneo.
3. *lampongensis* Brem. n. spec. — South Sumatra.
20. *lanceolata* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 297. 1937 — West Borneo.
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19. *longiscapa* Brem. n. spec. — East Borneo.
6. *maxima* Brem. n. spec. — North Borneo.
2. *microcarpa* Ridl., Fl. Mal. Pen. 2: 148. 1923 — Malay Peninsula and Sumatra.
7. *multiglandulosa* Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929 — North Borneo.
5. *myriocarpa* Merr. in Mitt. Inst. Allg. Bot. Hamburg 7: 296. 1937 — West Borneo.
24. *palawanensis* Brem. n. spec. — Palawan.
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 platyphylla Merr. in Univ. Calif. Publ. Bot. 15: 288. 1929 = *glabra*.
16. *polyantha* Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851 — West Sumatra and perhaps Malay Peninsula (*hirta* Ridl.).
 puberula Merr. in Papers Mich. Acad. Sci. 23: 195. 1938 = *microcarpa*.
 pubescens Ridl. in Jour. As. Soc. Straits 57: 63. 1911 — Malay Peninsula — species incertae sedis.
17. *scabridula* Brem. n. spec. — East Sumatra.
- 1.* *tortilis* (Bl.) Khs. in Ned. Kruidk. Arch. 2 (2): 246. 1851 (*Psychotria* Bl.) Java, West Sumatra.
 var. β Khs. l.c. — West Sumatra — incertae sedis.
9. *undulata* Khs. op. cit. 247; interpr. Val. in Engl., Bot. Jahrb. 44: 568. 1910 — South-east Borneo.
21. *urticina* Stapf in Trans. Linn. Soc. Ser. 2, Bot. 4: 182. 1894 — North Borneo.
 var. *glabrescens* Brem. n. var. — North Borneo.
 var. *Stapfii* Brem. n. nom. — North Borneo.
 Wallichii Merr. in Papers Mich. Acad. Sci. 23: 194. 1938, n. nom. illeg. = *microcarpa*.

Streblosa species etiam sub nomine generico *Psychotria* cognitae.

- Psychotria singalensis* Miq., Fl. Ind. Bat. 2: 294. 1857, n. nom. = *Streblosa polyantha* Khs.
- Psychotria tortilis* Bl., Bijdr. Fl. Ned. Ind. 958. 1826 = *Streblosa tortilis* (Bl.) Khs.
- Psychotria undulata* (Khs.) Miq., Fl. Ind. Bat. 2: 294. 1857, n. comb. (non Poir., Encycl. Suppl. 4: 591. 1816, sphalm. = *P. undata* Jacq., Hort. Schoenbr. 3: t. 260. 1798) = *Streblosa undulata* Khs.

ZEIST,

HOLLAND.